GAS JOURNAL

VOL. 260. No. 4515 101ST YEAR DECEMBER 14, 1949

FUEL POLICY

IT might have been possible to secure the necessary degree of integration and co-ordination of technical direction of which our public utilities stood in need without going the length of nationalisation; but nothing short of that was practicable in the political and industrial atmosphere of the past five years. Slightly altering the phrase in Dr. A. C. Dunningham's excellent presidential address to the North Western Fuel Luncheon Club in Manchester last week we may agree that it would be unfortunate, indeed, if the subsequent nationalisation of industries, not in the same category, for political rather than factual reasons, should prejudice public opinion and obscure the very real advantage that may accrue from the nationalisation of the coal industry. For this industry was split up into many units, over 2,000 of them, some far too small, mostly operating quite independently. Methods of production, with little or no technical and scientific co-ordination, tended to be dictated in the light of fierce competition in home and foreign markets with little regard to national economy. There was waste of our most valuable national asset and wages were forced down to a level far too low for so important and dangerous an occupation, giving rise to a recurrence of industrial unrest which had its repercussions in the whole field of the relations between capital and labour.

Dr. Dunningham declaimed any intention (and we have none either) of entering into political controversy. His remarks will be read with interest in the abstract which we publish on a later page. He stressed the importance of recognising the facts that published statistics relating to cost and output are inevitably averages, that they mark the very wide differences, not by any means to be fully accounted for by 'natural causes,' between pit and pit, and that the standard of performance of many individual mines should be capable of considerable improvement. Increase in mechanisation—the percentage of coal cut and conveyed by mechanical means had increased from under 30 to 70 in the last 30 years—had not been reflected in any substantial increase in average output per man-shift. Recognising the danger of comparing results in different countries, in which geological and working conditions differ widely, he quoted Sir Eric Young in the statement that whereas American miners were earning last year 75s. per shift against the 28s. of the British miner, the wages cost of coal was only 16s. per ton in America, against 26s. in Great Britain. He suggested that these figures showed that the American miner has accepted the machine, using it to increase his earnings and his output, whereas this is far from being the attitude of the British miner. Digging in that rich mine, Arnold Toynbee's 'The Study of History,' he found the dictum that civilisations are often threatened by the 'intractability of institutions.' This prompted him to the remark that we were, just now, trying to fit a welfare system with guaranteed social security into a world where men are still thinking that increased production leads inevitably to unemployment—a problem not peculiar to the coal industry but a characteristic of the times. And we may echo the hope that the efforts, not only of the Coal Board, but of management, technicians, and scientists throughout industry may not be brought to nought by this apparent intractability of human outlook in our country today.

Dr. Dunningham is well known as the Chief Fuel Technologist of Imperial Chemical Industries, a very large and enlightened user of fuel, which for many years has collected as much information as possible about coals, their composition and properties, their occurrence, production, and preparation. No doubt all this knowledge was necessary to the consideration and solution of fuel problems arising in so vast an industrial organisation. Much of this information has been generously placed at the disposal of industry generally. In the meantime the work carried out during the past 25 years by the Fuel Research Board in its Physical and Chemical (Coal) Survey Laboratories has resulted in the publication of some 60 reports giving analyses and descriptions of coal seams in all the principal coalfields, together with as much information as should, indeed, provide a broad comprehensive picture of our natural coal deposits. The National Coal Board is taking this work over. Eventually—one would think quite soon—all the coals produced by the Board will be fully described and classified into the several groups according to rank, so that every user will be able to choose the coal best suited to his requirements. One of the minor advances on classification is the adoption by the N.C.B. of the recommendations of the Size Grading Committee set up by the British Coal Owners Research Association by which the several hundred different nominal sizes of coal

formerly marketed will be replaced by eight nomenclatures defining, within adequately fine limits, the sizes of coals available. The splendid and effective work accomplished by the Fuel Research Board in standardising the sampling and analysis of coal and coke was also recognised. This work is now embodied in B.S.I. Specifications but F.R.B. Technical Paper No. 44, 'Methods of Analysis of Coal and Coke,' remains a classic.

Then Dr. Dunningham turned to a much smaller field, the combustion of coal in rather small boilers. There was room for great improvement here. His own great company, as well as B.C.U.R.A., has done great work in studying the factors affecting combustion in water-tube and shell boilers, using various types of mechanical stoker which have been greatly improved in design and construction. Perhaps the most interesting advance is in the application of the chain grate stoker to the shell boiler; the gas engineer is particularly interested in the Oldbury grate which successfully deals with the very lowest grade of fuels, such as rough wet coke breeze, in the Lancashire boiler. This use of low grade fuel is of national importance because coal cleaning inevitably leads to loss of combustion matter. One of the problems of the near future is the fixing of a balance between the cost of cleaning, the extent of cleaning, and the use of the small high-ash-content residual grades, which no doubt can be used economically provided the price is suitably adjusted. Consideration of this problem leads to that of a national price structure, since the price of cleaned coals must bear the cost of cleaning and make up for the low value of the residual grades.

NATIONAL INEFFICIENCY

DR. DUNNINGHAM turned to the efficiency of coal utilisation—taken as a whole this country was almost criminally wasteful in its use. He paid tribute to Mr. Olive Lyle's masterly paper 'Inefficiency,' after which there is really little more to say on this subject. It is achievement which is needed now. There is, however, one passage in this fine address which indicates a certain trend. The average efficiency of the 'great industrial power station,' it is noted, is about the same as that of the open domestic coal fire, which was put at 20%—a figure which, we suggested, is a little low for the one and a little high for the other. It is pointed out that in the case of the coal fire 80% of the heat goes up the chimney and that in the case of the electricity generating station 50% is lost in cooling towers and condensers. Means are now available by which the latent heat at present lost in the condensing system may be recovered as low-grade, pass-out steam from back pressure turbines and used for process or domestic heating. It is suggested that in this way the overall thermal efficiency of the central power station could be raised from 20 to 70%, representing an enormous saving in the 28 mill. tons of coal burned annually in our power stations—so great an economy that it was reasonable to ask why all the great new stations now being erected are of the condensing type. There was, of course, the difficulty that power stations, realising this great economy, would have to be erected where there was an economic outlet for low-grade steam either for process or for district heating, but the speaker was of the opinion that the enormous potential saving in this direction would compel serious attention to this question in the near future.

All this is very good talk—but what are we doing about it? We may freely admit that Dr. Dunningham and Dr. Grummell are doing and have done great work within their considerable but limited spheres. They have been well backed up by the work put in by such energetic and capable officials as Mr. S. N. Duguid, particularly in the training of stokers and combustion engineers. But what is lacking is a big nation-wide fuel policy for which we are still looking to the central organisations now controlling the production of coal, gas, and electricity. So far the gas industry has a record in fuel efficiency second to none. Our industry has been in the fuel efficiency business for over a hundred years. It has achieved a great measure of success—knowledge still outruns practice—but it has been hampered by a certain public and political prejudice which must be broken down. The use, or misuse, of bituminous coals for raw combustion must be abandoned and there are many uses of electricity which are not in the national interest. Mr. Lyle's proposed excise on raw coal is not, of course, politically practicable. We await a policy, practicable but yet informed with some imagination and conceived in a scientific spirit. As Dr. Dunningham put it—great economies can be made with comparatively little effort or expense by the application of existing knowledge. It is not now a technical problem at all, but a problem in the field of sociology and politics, both local and national.

ENTHUSIASM AND LOYALTY

MR. H. JAMES RISBY, Engineer and Manager of the Southport undertaking, last week completed his year of office as President of the local branch of Nalgo. Before installing his successor he delivered a Presidential Address in which he dealt with public relations and with the nationalisation of the gas industry, quoting extensively from the address which Sir Edgar Sylvester gave to the Institution of Gas Engineers at its annual meeting in London last June. That address summed up the sentiments of all but a negligible minority who serve the industry. 'If we can maintain that spirit of service that has animated our industry throughout its long career we are not likely to fall short in our endeavours,' said Sir Edgar, in concluding his address. 'We should approach the future with confidence and a determination to show that the individual can continue to display the same qualities of enterprise, enthusiasm, and loyalty, and that the new gas industry, which is the sum total of the individuals comprising it, can rise to even greater heights than before . . . . The future of our industry depends on your response, and of that response there can be no doubt.' An enthusiastic reception greeted Mr. Risby's address, but he must have blushed to find the *Southport Visiter* next morning had credited him, under a streamer headline, with much more originality than he could rightly claim for his selected quotations from the address delivered six months earlier by the Chairman of the Gas Council. The *Visiter's* report made no reference whatever to Mr. Risby's acknowledgment of the source of his inspiration, while in fact his many colleagues in the North West must have recognised many of the passages which he quoted.

'THE BEARING HAS SEIZED'

WHAT do these words really mean? Dr. Bowden and Dr. Tabor explained their meaning in a paper recently presented to the Institution of Mechanical Engineers, a paper not particularly easy for the non-specialist to read. Briefly, the facts are these. No metallic surface, however it is smoothed and polished, is truly flat. Seen under a sufficiently powerful microscope it reveals irregularities, lumps which are large compared with the size of a molecule. Therefore, when metallic

surfaces are placed together they actually touch over an area which is usually a very small proportion of the whole. When pressure is exerted, the local pressures at the points of real contact may be very high, so high as to produce plastic flow of the metal, so high indeed as to produce 'cold welding' with metallic junctions which may be so strong that when sliding takes place heavy damage to the parent metal may occur. The growth and extension of this localised damage constitutes 'seizure.' The function of lubrication is to keep the metallic surfaces apart and to interpose a film whose action is remotely similar to that of a ball-bearing. High temperatures facilitate the removal of films, whether of lubricant or surface films of oxidised metal or even absorbed gas or vapour. At high temperatures, too, the metal itself becomes more plastic, the metallic junctions are larger and more readily formed. Local high temperatures developed by frictional heating at the points of rubbing may be an important factor in causing seizures. A clear mental picture of what occurs in seizure will impress on the mind of the gasworks maintenance engineer the immense importance of attending to lubrication and particularly of selecting the most suitable type of lubricant for bearings in warm or hot situations. In some cases the plain lubricated bearing will not be safe and anti-friction metal or ball (or roller) bearings must be resorted to.

COAL—OUTPUT AND PROFITS

THE accounts of the National Coal Board for the third quarter of this year show that profits were slightly lower than for the previous quarter, but were approximately £3 mill. better than for the third quarter of 1948. They record for the mines worked by the Board profits, before charging interest, of £6,325,235, as against £6,376,883 in the second quarter of this year, and a surplus from the operation of both collieries and ancillaries, after defraying interest, compensation for loss of office, and estimated liability for profits tax, of £2,350,235, a decrease of £141,648 on the surplus of the previous quarter. The Board points out in an analysis of the accounts that owing to holidays, which 'lost' approximately 4½ mill. tons in the third quarter, the results cannot be reasonably compared with those for the second quarter; a more useful comparison, it says, can be made with those for the same quarter of last year. Such a comparison reveals that saleable output increased by 2.7% despite a fall of about 1% in manpower and an increase in absenteeism for all workers from 12.53 to 12.92%. Output per manshift rose from 1.09 to 1.14 tons. The cost of coal and power was reduced by 2.2d. per ton (6.5%), due partly to improved efficiency and partly to reduced internal prices of the poorer fuels consumed at the collieries. Proceeds increased by 6.7d. per ton as a result of price adjustments introduced in May, 1949, and improvements in coal preparation resulting in the marketing of better qualities of coal; colliery profits also increased by 1s. 2.3d. per ton, following reductions in cost of 7.6d. per ton, and increases in proceeds. These official comments noticeably conceal the fact that the total labour force in the mines, far from approaching the target of 736,000 set by the Government in the Economic Survey for 1949, has steadily declined throughout the period under review.

PROBLEMS OF RECRUITMENT

ALTHOUGH there has been an improvement in the up-grading of workers to the coal face, reflected in the fact that the average number of face workers during the first 39 weeks of this year was 297,000 compared with only 292,100 in the corresponding period of 1948, the number of faceworkers nevertheless dropped from 298,700 in the week ended March 26 to a present level of 293,600. Whatever the size of the labour force that will be needed in the future—and there is a wide divergence of official opinion on this point—recognition must be given to the concern felt by the miners themselves at this developing shortage of workers. The November bulletin of the National Union of Mineworkers urges that increased attention must be given to renewing the labour force from what must be regarded as the normal basic source of recruitment—namely, juveniles. 'In 1948,' the bulletin remarks, 'juveniles represented only 15% of the total number of recruits, and while there has been an improvement during the first 34 weeks of 1949, nevertheless the position must be regarded as critical in the extreme.' The improvement both in output and in profits which has been achieved this year has been made in spite of a slower rate of recruitment; the fact remains, however, that this limited success will be short-lived if new blood is not forthcoming to replace those workers who retire from the industry. This remains the greatest problem before the National Coal Board.

INSTRUMENTATION AND TRAINING

JUST over 18 months ago Mr. L. S. James presented to the London and Southern Junior Gas Association a comprehensive contribution on developments in instrumentation and automatic control in the gas industry, treating the subject from the point of view of the carboniser, chemist, works manager, and distributing engineer. Last week he gave a paper on similar lines to the Wales and Monmouthshire Junior Gas Association, dealing more particularly with installations actually operating in Wales. On both occasions, and more especially at Newport in view of the nationalisation trend towards integration of undertakings, he showed how scientific control had developed with vigour and rapidity as a contribution towards the ideal of optimum economy in gas manufacture and distribution. An important point arising out of the discussion was the question of training the necessary personnel to take care of the instruments and of instilling an 'instrument-mindedness' into the operatives. Speaking for instrument manufacturers in general and his own Company in particular, Mr. James described arrangements for the thorough training of clients' technicians and the facilities offered to executives to come and see for themselves what was done in the manufacturers' works. A difficulty that stands much more chance of solution under the new set-up of the gas industry than in the old days of individual and isolated undertakings is that of having specialists to take charge of instruments. No small or medium sized works could afford to have a member of its staff paying exclusive attention to instruments, but, as was pointed out by one of the speakers, it may well pay the area boards to have specialists who would devote their whole attention to the efficient maintenance of the instruments employed by considerable groups of undertakings. The best of systems is liable to failure if the operatives concerned are not instrument-minded. That desirable quality might best be cultivated by periodical talks to groups of the men affected in order to convince them that the instruments are there for their ultimate advantage, and that it is their job to look after them when officials are not about with the same assiduity as when they are under close observation.

SOLID FUEL STORAGE

THE paper presented by Mr. J. Pinckheard, A.R.I.B.A., to the Institute of Fuel on November 24, was a reminder that there is still much to do in the gas-education of the architect. In his introduction the author, Mr. Pinckheard, made the unqualified statement, which he plainly thinks is quite incontrovertible, that 'the economy of heating by solid fuel . . . . has for long ensured its *universal adoption* (our italics) both for domestic heating and for heating most of the larger types of buildings.' One of the reasons why this is not so, particularly for the larger types of buildings, is implicit in his paper, 'The Storage of Solid Fuel in Relation to Buildings'; so also is the necessity to educate the architect on this point. For he plainly regards the provision of such storage as part of his job—'if the requirements are known and understood in advance suitable provision can be made *by the architect'* (italics ours again). The extent of the provision which has to be made is considerable; and Mr. Pinckheard recognises that it creates a problem which is very different in densely built-up urban areas from that set up by a building on an open site. This is, of course, the very reason why gas-fired heating systems are extending so rapidly in the hearts of our great cities. For example, in providing access for deliveries of solid fuel the typical turning

space for modern road vehicles may be 63 ft. in diameter, an area to be added to that required for the storage itself. In densely built-up areas the provision of such a space is indeed a problem. The effect of much urban development is 'to produce round the perimeter of each island site a dense ring of buildings enclosing an internal area or courtyard which is often inaccessible from the street.' The saving of solid fuel storage space on such a site may well be another item to place with the saving of labour and dirt against the possibly somewhat higher cost of a clean, refined fuel stored at the gasworks and ready on tap where and when the consumer requires it. Our task is to get this over to the architect so that the buildings of the future will be designed not always with provision for solid fuel storage but in such a manner as to make the best use of gas fuel. One of our difficulties is that gas is not always the best for space heating—and we are aware of the difficulties of its too wide application to this problem—and coke needs storage space as much as coal.

Personal

Mr. **H. A. Adcock,** General Manager of Metropolitan Gas Meters, Ltd., has been elected a Fellow of the Royal Society of Arts.

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Councillor **J. H. Lewis,** M.B.E., J.P., of Harborne, Birmingham, has been appointed a member of the West Midlands Gas Consultative Council.

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Mr. **J. R. W. Alexander**, M.A., LL.B., F.C.I.S., was elected Senior Vice-President of the Chartered Institute of Secretaries at its 58th annual meeting on December 6.

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Mr. **T. Dixon** has been appointed Comptroller, and Mr. **E. J. Spurrier,** Commercial Manager of Parkinson and Cowan (Gas Meters), Ltd. The appointments will take effect on January 1.

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Mr. **E. C. LeJeune,** M.S.E., M.SOC.C.E. (France), Assistant District Manager, South Eastern Gas Board, has been elected to membership of the Council of the Society of Engineers for 1950.

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Mr. **G. Murray Burton,** M.A., F.C.A., would like those of his business friends who are aware that as the result of nationalisation he has left the gas industry in the United Kingdom, to know that he is retaining for professional purposes part of the offices at 5, Great Winchester Street, Old Broad Street, London, E.C.2. The Malta Company will continue to be administered from there.

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Mr. **P. G. Somerville,** who retired a few months ago from the Secretaryship of the National Benzole Association, has been for 25 years a member of 'U.S.'—United Secretaries, membership of which is confined to secretaries of organisations connected with motoring. As 'Skipper' he presided at the 'U.S.' annual dinner at the Royal Automobile Club on November 28 and proposed the toast of the guests, for whom Lord Sandhurst responded.

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Mr. **S. Hands,** Engineer and Manager of the former Sleaford (Lincs) Gas Company, has retired. He went to Sleaford from Harwick in 1920, and in 1941 he was appointed Managing Director of the Company and continued to serve as Engineer and Manager of the works after nationalisation. In his 29 years at Sleaford he has seen the number of consumers and the amount of gas produced doubled. The staff and employees of the works have presented him with a barometer.

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Mr. **Robert W. Nicholls,** Engineer and Manager of the Durham undertaking of the Northern Gas Board, has retired after 56 years in the industry, including 36 at Durham. Mr. Nicholls began his career at Darlington gasworks and became an assistant to the engineer. He was appointed Engineer and Manager at Durham in 1914. A presentation has been made to Mr. Nicholls by Mr. A. S. Middleton, formerly Secretary of Durham City Gas Company, and now Assistant Secretary of the Northern Gas Board.

Miss **Edith Ann Dewar,** Personal Secretary to the Chairman of the Northern Gas Board, is retiring after 30 years with the Newcastle and Gateshead Gas Company and the Northern Gas Board. She recently received a presentation from the board's employees at Newcastle.

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Mr. **William R. Macnabb,** who since 1921 has been Administrative Assistant at Uddingston, was on November 30, presented with the staff's gift of a radio set to mark his retirement. He started his business life in 1902 with the Glasgow firm of Kidson, Goff and Findlay. While with that firm he audited the books of the old Cambusland and Uddingston Gas Companies and, in April, 1914, was appointed Secretary to the former. When Lanarkshire County Council took over the gas undertakings he was selected for the post of Administrative Assistant at Uddingston.

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Mrs. **Mary Buchanan** has resigned from the post of Organising Secretary of the Women's Gas Council, and will leave in the New Year to devote more time and personal attention to the work of the British Committee of the Pestalozzi international children's village in Switzerland, of which she is the Hon. General Secretary. She has also been invited recently to write a world survey of women's organisations. Mrs. Buchanan was educated at Queen's College, London, and the London School of Economics. During the war she was Mobile Investigator to the Wartime Social Survey, Ministry of Information; Assistant Analyst to the Federal Communications Commission, Foreign Broadcasts Intelligence Service, U.S. Embassy; and General Secretary of the London Regional Refugee Council, Home Office. She took up her position with the Women's Gas Council three years ago.

Letters to the Editor

A REMEDY SOUGHT

DEAR SIR,—I am writing to enquire if any of your readers can advise me how to prevent the formation of a yellow sticky liquid in the flue pipe of my gas boiler. The boiler was installed about three years ago and the trouble started after about a year of continuous working.

The flue passes through a concrete roof 3 in. thick and has a cowl on the top. The yellow deposit burns away the enamel on the top of the boiler and the flow is continuous. Neither the firm who installed the boiler nor the representative of the North Thames Gas Board have been able to deal with this trouble.

To an electrical engineer who is accustomed to fixed specification limits it is difficult for me to understand why there should be any mystery about the length or diameter of a flue for a gas boiler for domestic use.

Yours faithfully,
S. R. MULLARD.

The Pantiles,
Englefield Green,
Egham, Surrey.
December 10, 1949.

TREATMENT OF EFFLUENT LIQUORS

DEAR SIR,—As so much interest is being taken at the present time in the treatment of effluent liquors from gasworks, we would mention that we have recently installed a novel and inexpensive plant for the treatment of 200 gal. of ammoniacal liquor per hour at a neighbouring gasworks. This plant totally eliminates the soluble sulphides in the liquor and materially reduces the oxygen absorption.

Representatives of the Rivers Board have inspected the plant and taken samples of the liquor before and after treatment, and they now raise no objection to the treated liquor entering the sewers.

The cost of operating the plant is only a few pence per 1,000 gal. of liquor treated, and we hope in the very near future to place this plant on the market.

Yours faithfully,
L. WALKER,
Director.
R. and J. Dempster, Ltd.

Gas Plant Works,
Newton Heath,
Manchester, 10.
December 6, 1949.

Obituary

Mr. **A. R. Anderson,** for 12 years Engineer and Manager of the Vale of Leven gas undertaking, died on November 26, aged 53. Mr. Anderson went to the Vale of Leven from Glasgow Corporation 20 years ago as a chemist, and was later appointed Assistant Manager. He was an Associate of the Royal Technical College, and a member of the Institution of Gas Engineers.

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The death occurred on December 7 of Mr. **H. G. Wice** after a short illness. Mr. Wice, who had been a member of the staff of the Power-Gas Corporation, Ltd., and Ashmore, Benson, Pease & Co., Ltd., Stockton-on-Tees, for the past 10 years, had been connected with the gas industry for most of his career, and his cheerful personality was well known to many gas engineers throughout the British Isles. He was carrying out his duties until the week before his death, when he appeared to be in good health.

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Mr. **Arthur W. Farquhar,** Engineer and Manager of the Forfar undertaking since May, 1948, has died. Prior to going to Forfar he had been Manager at Fraserburgh for 19 years. Mr. Farquhar served his apprenticeship with the West-End Garden Works Company, Edinburgh. He was later Engineering Assistant with Edinburgh Corporation Gas Department at Granton, and Technical Assistant at Buckhaven and Leven. He was a member of the Institution of Gas Engineers and was Chairman of the North Eastern section of the North British Association of Gas Managers.

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JAMES JAMIESON

Mr. David Fulton writes: Since retirement on account of ill-health some three years ago, the public appearances of the late **James Jamieson** had been very rare and it might have been thought that he had passed into the category of persons almost forgotten or only faintly remembered. That it was not so was amply demonstrated by the large gathering of friends from all over the country who, last Wednesday, on a wet and boisterous day, filled the Warriston Crematorium Chapel, Edinburgh, to show their regard for him and to pay their last respects. To the man of action there can be no fate more cruel than to be stricken by an insidious and wasting disease at the moment of the zenith of his powers just when he is able to feel that the culmination of all his hopes and ambitions is at hand. That was the tragic lot of James Jamieson—a lot which he bore with all the resolution and courage which marked his career.

Throughout his life James Jamieson had one consuming passion—to make a prosperous and healthy gas industry and to that end his great energies were unremittingly bent. It can be said of him that he lived for the gas industry and the development of the great Edinburgh gas undertaking is a warrant of the success of his efforts. His activities in the affairs of the industry at large were all-embracing and he did much to establish a high prestige for the industry. For several years he was looked up to as the leader of the gas industry in Scotland, and his skill in guiding and directing movements and opinions were of the greatest value in promoting coherent action. All that he did was done intensely and that is a great strain on any man. It was his misfortune that he did not relax readily and that his interests were not of a wider character. Some years ago, he attempted to take up golf, but he found little interest in the game and indeed he had little interest in sport generally. There were, to him, so many better things to do and so little time to do them. He was most generous and hospitable, loving good company and preferring to entertain rather than be entertained. To young men who showed zeal and enthusiasm he was most kindly and helpful, but he was intolerant of all who would seek to achieve success by easy roads. For him only the hard road led to worthwhile accomplishment.

'By their fruits ye shall know them,' and the work that he did remains so that, in the words of the Apocrypha, 'He is of them that have left a name behind them.' All who were privileged to work with him and to know him will remember him kindly and gratefully.

Diary

Dec. 16.—Scottish Junior Gas Association (Western District): Dinner, Dance, and Presentation of Medals and Awards. Cadoro Restaurant, 120, Union Street, Glasgow.

Dec. 17.—Yorkshire Junior Gas Association: 'Commercial and Technical Co-ordination,' W. Bennett (Bradford Group). Strafford Arms Hotel, Bull Ring, Wakefield. 2.30 p.m.

Dec. 29.—North Thames Gas Consultative Council: Monthly meeting, St. Ermins Hotel, Westminster, 2.30 p.m.

Jan. 10.—Midland Junior Gas Association: 'Benzole Recovery by Activated Carbon,' H. L. Fielder (Worcester).

Jan. 11.—Wales and Monmouthshire Junior Gas Association: Whole-day Meeting, Port Talbot. Paper by R. H. Hanford (Port Talbot). Afternoon tour of Abbey Works, Steel Co. of Wales.

Jan. 11.—Western Junior Gas Association: Visit to Gloucester gasworks. 'Distribution Problems and Developments at Stroud,' F. W. Nichols. Showrooms, Gloucester.

Jan. 13.—Scottish Junior Gas Association (Western District): 'Pressure Holder Installations,' A. Austin and A. Johnson (Whessoe, Ltd.).

Jan. 13.—London and Southern Junior Gas Association: 'District Problems,' A. E. Taylor (West Surrey Division, South Eastern Gas Board).

Jan. 18.—Eastern Junior Gas Association: 'Domestic Hot Water,' J. E. Cooper (De La Rue Gas Development, Ltd.). Spalding.

Jan. 19.—Midland Association of Gas Engineers and Managers: 'Some Aspects of the Large Scale Manufacture and Distribution of Producer Gas,' A. Robinson (Chief Engineer, South Staffordshire Mond). Queen's Hotel, Birmingham. 2.30 p.m.

Jan. 21.—Yorkshire Junior Gas Association: 'Present Day Distribution Problems,' J. Hoskin. Leeds.

Jan. 25.—Scottish Junior Gas Association (Western District): Afternoon Visit to Gartsherrie Ironworks and Coke Ovens, Bairds and Scottish Steel, Ltd., Coatbridge.

Jan. 25.—London and Southern Junior Gas Association: Visit to Lines Tri-ang Works, Morden.

NEW BRITISH STANDARDS

The British Standards Institution has recently issued B.S. 1614, Brickwork settings for cylindrical boilers (3s., post free). This standard has been published to make available to purchasers and constructors of boiler settings the work carried out by the Shell-type Boiler and Firing Equipment Committee of the British Coal Utilisation Research Association. The Committee, through a panel representing the Shell Boilermakers' Association and the Association of Boiler Setters, Chimney, and Furnace Constructors, provided the material which forms the basis for the standard.

Part I deals with basic materials such as firebricks, common bricks, concrete and jointing materials; part 2 refers briefly to excavation and drainage; part 3 specifies the construction of the concrete raft; part 4 deals with boiler brickwork, specifying the method of construction and thicknesses of brickwork of the seating beds, seating blocks, flues, &c.; and part 5 deals with economiser brickwork in a similar manner. An appendix sets out ratings for Lancashire boilers.

Two further British Standards have been issued in the series of standards for the petroleum industry, viz., B.S. 1575, Cast Iron Pipe Flanges and Flanged Fittings, Class 125, for the Petroleum Industry, and B.S. 1576, Cast Iron Pipe Flanges and Flanged Fittings, Class 250, for the petroleum industry (7s. 6d., post free). Both have been prepared after careful consideration of American Standard Association Standards for Cast Iron Pipe Flanges and Flanged Fittings. The standards give full details for the design and construction of flanges and flanged fittings and provide detailed tables, giving all the dimensions required. Appendices are included giving details for marking, as well as approximate weights.

Copies of all these publications may be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, at the prices indicated.

News in Brief

Ossett Corporation has been informed by the North Eastern Gas Board that a reduction in street lighting charges is being considered. The Borough Surveyor has been instructed to prepare an estimate of the cost of converting the lighting in a length of one of the main roads.

The Gas Council Stand at the Building Exhibition, Olympia, attracted over 500 enquiries from all parts of the country. A large proportion of these came from architects, surveyors, builders, officials employed upon the planning of new towns, and from firms concerned in the export of gas appliances.

The Second Meeting of the Scottish Gas Consultative Council was held at Edinburgh on November 17 under the Chairmanship of Mr. A. T. Morrison. The main business of the meeting was the preparation, for submission to the Minister of Fuel and Power, of a scheme for the appointment of district committees, and consideration of increases in gas prices recently announced by the Scottish Gas Board. The Chief Financial Officer of the board attended and explained the reasons for the increases.

A Record Output of coal was achieved last week with the production of 4,572,100 tons, 95,800 tons better than the week before. Manpower during the week ended November 26 rose by 400 from the previous week's total of 708,300, which was the lowest for two and a half years. The number of workers at the coal face, however, remained the same. The total of gas available at gasworks rose during the week from 11,373.6 to 11,546.1 mill. cu.ft., and an increase of 26.8 mill. units was recorded on last week's total of 1,034.2 mill. units of electricity sent out for public supply.

Two Christmas Lectures for boys will be given by the Institution of Civil Engineers at the Institution, Great George Street, London, S.W.1. The first lecture, on December 30, at 3 p.m., will be given by H. Shirley Smith on 'The Wonders of Big Bridges'; the second, on January 2, at 3 p.m., will be given by C. W. Knight on 'The Building of Dams.' The lectures, which are primarily intended for boys between the ages of 13 and 17 years, will be illustrated with films and lantern slides, and tickets (free) may be obtained from the Secretary of the Institution.

The Federation of British Industries, through its education and industrial research committees, organised a week-end conference of more than 100 leading industrialists and representatives of British Universities, held from November 25-28, at Ashorne Hill, Warwickshire. Introductory addresses were given by Sir Charles Tennyson (Chairman of the F.B.I. Education Committee) and Sir Hubert Henderson, Professor of Political Economy in the University of Oxford. The subjects discussed included industry's requirements of arts graduates, scientists, and technologists, and their education and training. The speakers included Sir Arthur Fleming, Sir Humfrey Gale, and Dr. Percy Dunsheath for industry.

The London Office of the Copper Development Association, at Grand Buildings, Trafalgar Square, London, W.C.2, is being transferred to the Association's headquarters, and all communications should now be addressed to the Association at Kendals Hall, Radlett, Herts, tel. : Radlett 5616.

Representatives of Scottish gas stockholders recently adopted a resolution in committee asking the Minister of Fuel to consider what steps should be taken forthwith to meet the injustice caused to stockholders by the issue to them, as compensation, of 3% Gas stock at par. It was clear, the stockholders pointed out, that the stock could only be realised at a very substantial discount.

A Series of cookery demonstrations organised recently at the Constitutional Hall, Cleveleys, by Mr. R. B. Garside, Engineer and Manager of the Thornton Cleveleys undertaking of the North Western Gas Board, was opened by Miss Violet Carson, star of the Wilfred Pickles 'Have a Go' B.B.C. programmes. The demonstrations were attended by 691 housewives.

Mr. J. R. W. Alexander presented the prizes at Thetford Grammar School (founded in 1114), on November 17. Among those present were Mr. R. A. Weston (Norwich) and Mr. L. C. B. Williams (Thetford). The visitors, parents, and boys saw practical demonstrations of gas, coke, and products manufacture and utilisation in the chemistry and physics laboratories. The arts and crafts rooms had exhibits relating to gas, and there was also a debate on gas versus electricity. The Gas Council's colour film, 'The Nation's Wealth,' was shown.

Billingham-on-Tees Urban Council has received a letter from the Northern Gas Board concerning the Council's opposition to paying 65s. per house to have gas laid on. In the past, the board stated, many gas undertakings had been owned by local councils and as the majority of the houses to be supplied were council houses, no charge had been made for laying on gas. The board had, however, no option in the matter and asked for the Council's sympathetic consideration of the matter. The Council has decided to continue its opposition to the proposal and the attitude of other local authorities is to be ascertained.

Since the Opening of the Gas Council's new display at the Building Centre—'Gas in the Design for Living'—on October 6, 1,183 enquiries have been recorded up to the end of October. An analysis of these enquiries shows that very few have been of a casual nature. The majority of callers, such as architects and representatives of local authorities, have visited the exhibit to discuss specific problems of gas utilisation. The design and layout of the display have received the highest praise. Some interesting facts emerge from an inspection of the attendance schedule. This shows that most enquiries have been received for a balanced flue heater, drying cupboard conversion unit, finned-back boiler, and convector coke grate.

Although 11 out of the 12 administrative counties in the area have agreed to allow portions of their Arms to be incorporated in the Eastern Gas Board's seal, the Isle of Ely County Council, at their meeting on November 30, approved a recommendation of their General Purposes Committee that similar permission should not be given.

The Ministry of Transport has been asked by Durham County Council to give a decision regarding the use of a site at Fishburn by the Northern Coal Board for the erection of a coke-oven and by-product plant. Objection has been raised to the proposed site on the grounds of its nearness to a hospital.

The Scottish Gas Board is to spend £202,000 on a new carbonising plant with complete coal handling facilities at Inchgreen gasworks, Greenock. This extension is designed to facilitate centralisation of production and supply to the Greenock, Gourock, and Port Glasgow areas. Potential output will be 2 mill. cu.ft. per day with scope for further expansion to 4 mill. cu.ft. per day. The present intention is to have the scheme in operation by mid-1952.

Mr. E. G. Brooks, General Manager (works) of the Potterton Gas Division of Thomas De La Rue and Co., Ltd., talked on the installation, fixing, and regulation of gas boiler controls to the Gas Salesmen's Home Circle, East Surrey Division, at Croydon, on December 5. This lecture marked the end of a series of visits and discussion which included attendance at the De La Rue Wandsworth works. The meeting was opened by Mr. E. Wulstan Atkins, sales service manager of the East Surrey Division of the South Eastern Gas Board.

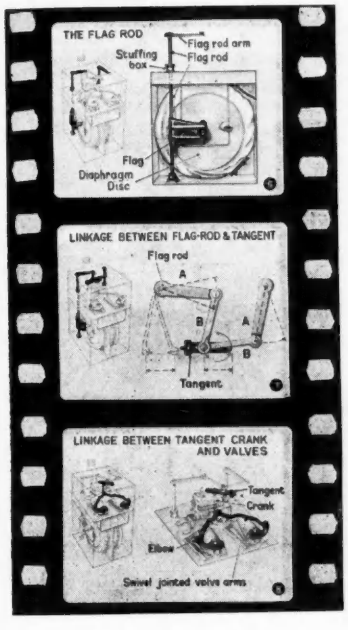
The North Western Gas Board's stand at the Better Housekeeping Exhibition in Manchester was a 'prestige' rather than a 'selling' design. It attracted more than three times as many enquiries for appliances as were received last year in the same exhibition, although the general attendance at the exhibition was smaller. Special interest was shown in the board's coke and live coke fire displays, and no fewer than 273 enquiries were received for coke grates. A committee representing the Manchester, Stretford, Salford, Altrincham, Wilmslow and Knutsford undertakings was responsible for the arrangements.

Speaking at Bramhope on November 19, Colonel Stoddart-Scott, M.P. for Pudsey and Otley, referred to the increased price of gas in the new Ripon Parliamentary Division, and expressed his intention of investigating whether the changes had been carried out in accordance with the statute. He stated that before the price variations were announced the Chairman of the North Eastern Gas Board had declared there would be reductions in residential and rural areas. When Colonel Stoddart-Scott asked what reductions might be expected in the new division, composed entirely of residential and rural areas, he was amazed to be told that the price was to be increased in every one of the areas, except Wharfedale Rural District.

The Working of a Gas Meter

A New Film Strip

IN response to a number of requests from gas undertakings throughout the country, Parkinson & Cowan (Gas Meters), Ltd., have produced a film strip on the working of a gas meter. The film strip is divided into two parts, Part I dealing with the ordinary meter, and Part 2 with the coin meter. The strip is



The ordinary meter.

issued with a booklet of teaching notes, and is produced primarily for use by gas undertakings in the training of their fitting, sales, and service staffs, and also for teachers conducting evening classes in any of the following courses :—

1. Gas Engineering (Supply)—Ordinary Grade.
2. Gas Technology (Supply).
3. Gas Salesmanship and Consumers Service.
4. Gas Fitting—Intermediate and Final.

The teaching notes have been produced in a condensed form and are intended to be used as a guide to the instructor in the manner in which the lecture should be given, and are not intended to be read out verbatim. A sufficiency of technical explanation is given, however, to enable the instructor fully to explain the picture.

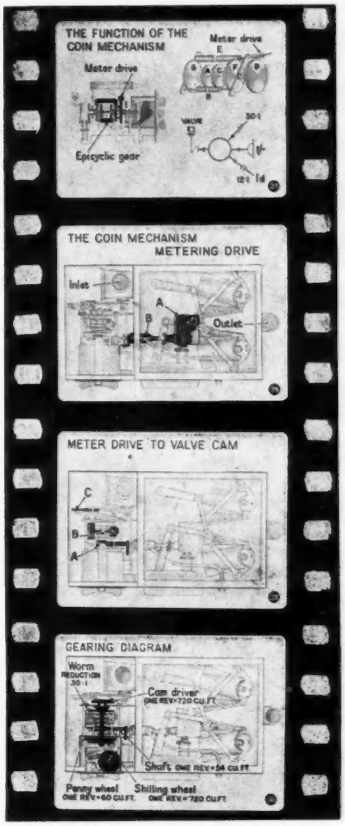
Part I of the strip, which consists of 17 frames, traces the construction of the meter from the bare case and leads on to show how it is built up in two identical sections. It clearly indicates the nature and cause of the diaphragm movement and traces the manner in which the diaphragm movement is conveyed through the flags and flag rods to the top arms. It continues by illustrating in detail the linkage between the top arms and tangent, and shows how any adjustment of the tangent has the effect of restricting or increasing the travel of the diaphragms. Further frames are devoted to the linkage between the tangent, crank and valve covers.

By a series of frames which give exposed views of the complete meter operation, the student is enabled to see the relationship between the diaphragms, tangent, crank and valve covers throughout the cycle of the meter.

Part I concludes with pictures illustrating the gear box and index drive, and explains the manner in which a revolution of the crank is translated into a reading on the index dial. The last frame shows an exposed view of the direct reading index.

Part 2, which consists of 15 frames, deals essentially with the coin mechanism, and the frames are so designed as to illustrate the process which occurs when a coin is inserted into the meter. It commences with frames showing the inlet end of the meter and the construction of the valve box, and builds up a step at a time until the student can see the complete functioning of a two coin mechanism and can trace the transmission through the series of gears and differential from the coin pocket to the stop valve, and from the meter drive to the stop valve.

At the end of the teaching notes there is an appendix which gives the answers to likely questions which may be raised by students after seeing this film strip, and gives the specifications of the main materials used in the construction of a meter. The film strip, which is entitled 'The Working of a Gas Meter,' together with the book of teaching notes, is now available, price 15s., on application to Parkinson & Cowan (Gas Meters), Ltd., 52, Grosvenor Gardens, London, S.W.1. or from the Gas Council, 1, Grosvenor Place, London, S.W.1.



A section of the film strip illustrating the prepayment meter.

GAS STOCK ISSUES

In the House of Commons on November 28, Sir **John Mellor** (C., Sutton Coldfield) asked the Minister of Fuel and Power why he authorised the substitution of Gas stock redeemable 1990-95 for securities converted on November 21, when the market value of short or medium-dated stock would have been less distantly related to the market value of corresponding Government securities at the vesting date, May 1, and whether he would, under Regulation 1 (3) of the Gas (Stock) Regulations, 1949, withhold his consent from any further issue of long-dated Gas stock for purposes of compensation.

Mr. **Gaitskell** replied : 'It is a principle of sound finance that public utilities should borrow as long as possible for capital works. Adherence to this principle was particularly desirable in the case of British Gas stock, 1990-95, which was issued as compensation and in replacement of long-term and even irredeemable securities of the old undertakings. For the same reason it is regarded as unsound to change over to the issue of a short-dated stock on conversion dates. The answer to the second part of the question is accordingly in the negative.'

Sir **John Mellor** continued : 'Does the Minister consider that an injustice for some is an argument in favour of injustice for all ; and will he agree that there is no statutory reason why he should not now issue a short-dated stock which would be much fairer to the recipients ? '

Mr. **Gaitskell** replied : 'There would be no statutory barrier for my arranging for the issue of short-dated stock, but I explained in my original answer why we chose not to do so.'

In the House of Commons on December 12, the following resolution, moved by Colonel Stephenson Clarke (C., East Grinstead), was negatived by 234 votes to 87 : 'That this House views with deep concern the losses caused to creditors, co-partners and other holders of gas securities by the issue of British Gas stock at a valuation that bears no relation to its true value at the date of issue, and urges on the Minister the necessity either to ensure the issue of a shorter-dated stock in satisfaction of compensation and making such stock convertible at par with gas stock already issued, or by some other method to rectify the present injustice.'

Mr. Gaitskell Visits Pontypool

Workers' Views on New Gasworks

The increasing importance of Pontypool as an industrial area was stressed by Mr. Hugh Gaitskell, C.B.E., M.P., Minister of Fuel and Power, when he visited the new gasworks there on December 8. He was to have opened this new undertaking on October 20, but owing to urgent business at the last minute, he was unable to attend and the ceremony was performed by Mr. A. Robens, the Parliamentary Secretary.

On Thursday, Mr. Gaitskell made a tour of the works accompanied by Mr. T. Mervyn Jones, Chairman of the Wales Gas Board; Mr. John Powdrill, General Manager of the Pontypool undertaking; Mr. F. C. Jenkins, Secretary; and Mr. J. W. Davies, Senior Officer, Ministry of Fuel and Power.

He spoke to several of the men at work in the retort house, asking them for their opinions of the new works. Mr. A. Tinkler, a top main stoker, seemed to express the general view of all the workers when he replied that he preferred working on the new undertaking. 'The new plant is very much cleaner,' he said, but he also added a word of criticism because of the fact that when the Blaenavon coke ovens closed down, it was not possible to absorb all the employees into the new works. Mr. Gaitskell pointed out that there were only a very small number affected, and they had all been absorbed into other industries in the area.

Before leaving for Newport, where a luncheon was given by the Wales Gas Board, Mr. Gaitskell said that he had been very impressed with the new works. Some little time ago there had been a good deal of trouble in the valley because the Blaenavon coke ovens collapsed before the new works were completed, but with the help of Mr. Powdrill and thanks to great efforts by the men, they managed to keep things going.

'The appearance is one of the most striking things about it,' he went on. 'Anyone coming over the hill, as we did this morning, would not think it was a gasworks.'

It was exceptionally clean inside and he hoped that as the grid developed in that area it would be able to play an increasingly important part in supplying gas not only for domestic use, but also for industry. In the course of time, as the various industries developed, they would need more gas. 'Here, we have a site where we can build to supply the gas required,' he concluded.

Newton, Chambers and Co., Ltd., have received a new order for tower type purification plant at the Dover gas undertaking. It will comprise five working towers, a stocking tower and stocking frame, complete with gas connections, valves, oxide handling plant, &c., with a capacity of 10 mill. cu.ft. per day.

A lecture on domestic water heating, arranged by Mr. N. C. Sturrock, Group General Manager of the York-Harrogate district of the North Eastern Gas Board, was recently delivered by Mr. G. F. Jenkins, Sales Manager of **Main Water Heaters, Ltd.,** to the fitting, maintenance, and sales staffs of the group. Mr. Jenkins dealt specifically with the reasons for the present trend towards the storage types of appliances and explained, by means of lantern slides, the advantages to the user, the points of construction, and the easy maintenance features of the Thermain No. 2 sink type, the Thermain No. 15 multi-point type and the G.L.C. Circulator. He also showed how some disadvantages in instantaneous types were successfully overcome by the Pronto sink heater, of which there are two forms, one with interlocked control and the other with automatic valve.

Midland Tar Distillers, Ltd.

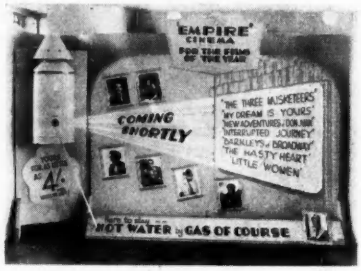
Net profits for the year ended June 30, after charging depreciation £78,651, against £71,679 for the previous year, profits tax £35,275, against £34,175, and income tax £76,634, against £76,143, was £92,712, compared with £90,934 for the previous year. Dividend on the increased Ordinary capital of £675,000 is maintained at 8%.

Conserving Heat

We learn that the Reymor Brick Company, Ltd., of Wolverhampton, has co-operated with an industrial gas engineer in the West Midlands and has taken out a patent for a new type of interlocking, pre-cast insulating brick. Already the company has carried out many installations in the West Midlands area and elsewhere, and fuel consumption has been considerably reduced as a result. Reductions of up to 30% have been shown, and we are informed that the cost of insulation has been recovered within 12 months. These insulating bricks are very interesting. They can be assembled round any heated metal tank by unskilled labourers without the use of any jointing material.

The bricks consist of a mixture of sand, cement fondu, and 'Vermiculite' (an asbestos material of the mica family). They are soft enough to be cut or sawn with ease, yet tough enough to stand hard wear and tear. When assembled round a heated tank, holes can easily be cut to admit gas pipes or other fittings, and to provide secondary air inlets and flue outlets where necessary. Each brick is rectangular in outline and of standard thickness, formed with a tongue on one edge and a groove in the opposite edge to receive the tongue of the next brick, and special bricks are provided for corners.

Further particulars can be had from the Reymor Brick Company, Ltd., at 48, Church Lane, Wolverhampton, Staffs.



This window display, featuring a Ewart geyser, was recently staged by the West Midlands Gas Board (Coventry District) in conjunction with a local cinema.

This photograph was taken at the opening of the demonstration of infra-red cookery at the Building Centre on December 1, details of which were published on p. 586 of last week's JOURNAL. *The principal figures in the group are Mr. Frank Yerbury, Managing Director of the Building Centre; the Earl of Limerick, Director of Parnall and Ascot Gas Water Heaters, Ltd.; and Mr. Arthur Docking,* M.I.P.E., *Chairman and Governing Director of Radiant Heating, Ltd. In the background is M. Poubeau, Chef at 96, Piccadilly.*

Institution Education Scheme

Supplementary Examination Results

EXTERNAL CANDIDATES (9)

Diploma in Gas Engineering (Manufacture) (1)

Class	Name	Town
Second	Potter, G. H.	Birmingham

Higher Grade Gas Engineering (Manufacture) (2)

Class	Name	Town
Second	Henderson, P. L.	Norton-onTees
„	Trevelyan, P.	Newbury

Ordinary Grade Gas Engineering (Manufacture) (4)

Class	Name	Town
Second	Atkinson, R. K.	Leeds
„	Mylrea, F. A.	Isle of Man
„	Hillsdon, R.	Thame
„	Tomlin, G.	Hitchin

Higher Grade Gas Engineering (Supply) (1)

Class	Name	Town
Second	Carter, G. B.	Liverpool

Ordinary Grade Gas Engineering (Supply) (1)

Class	Name	Town
Second	Skinner, E. G.	Sheffield

INTERNAL CANDIDATES (34)

Higher Grade Gas Engineering (Manufacture) (5)

Class	Name	College
First	Mountjoy, L. J.	Westminster
Second	Mann, C.	Birmingham
„	Platt, R. E.	Wigan
„	Skinner, S. N.	Westminster
„	Stalker, A. K.	Newcastle-upon-Tyne

Ordinary Grade Gas Engineering (Manufacture) (13)

Class	Name	College
First	Brown, J. M.	Westminster
Second	Cooke, A. H.	Newcastle-upon-Tyne
„	Hall, J. A.	Burnley
„	Johnson, O.	Birmingham
„	Lea, R. J.	Gloucester
„	Poulson, R. A.	Birmingham
„	Sanderson, G.	Newcastle-upon-Tyne
„	Sims, T.	Newcastle-upon-Tyne
„	Waddle, J.	Newcastle-upon-Tyne
„	Whitehead, I. J.	Brighton
„	White, D. F.	Brighton
„	Worrall, W. D.	Gloucester
„	Wright, S. J. P.	Manchester

Higher Grade Gas Engineering (Supply) (3)

Class	Name	College
Second	Mitchell, A. R.	Newcastle-upon-Tyne
„	Rolls, E. H.	Westminster
„	Ross, J. E.	Westminster

Ordinary Grade Gas Engineering (Supply) (12)

Class	Name	College
First	*Male, W. L.	Newcastle-upon-Tyne
„	Wainton, H.	Newcastle-upon-Tyne
Second	Allwood, R. W.	Birmingham
„	Bovill, F. A.	Newcastle-upon-Tyne
„	Butchart, J. P.	Dundee
„	Hall, D. T.	Birmingham
„	Kirkbright, R. E.	Bradford
„	Massey, J. J.	Burnley
„	Ord., E. J.	Newcastle-upon-Tyne
„	Saint, J. C.	Newcastle-upon-Tyne
„	Simmons, W. P. H.	Tottenham
„	Swan, J. G.	Newcastle-upon-Tyne
„	Thornton, R. J. W.	Westminster

SUPPLEMENTARY EXAMINATIONS, SEPTEMBER, 1949

Internal candidates of Westminster Technical College under the Further Education and Training Scheme (36).

Higher Grade Gas Engineering (Manufacture) (12)

Class	Name
First	Brown, J. M.
Second	Alexander, E. P.
„	Beattie, C. W.
„	Cam, G. W. A.
„	Chesworth, J.
„	Dan, S.
„	Danton, S. A.
„	Fry, C.
„	Haslam, E.
„	Heywood, D.
„	Humby, A. J.
„	Sagrott, A. G.

Higher Grade Gas Engineering (Supply) (12)

First	Burchell, D. E.
„	Pratt, R.
Second	Barrett, J. C.
„	Brunt, J.
„	Cawte, F. R.
„	Clayson, J. A.
„	Drury, W. R.
„	Gunning, R. C.
„	Moule, E. S.
„	Sadler, A.
„	Sadler, A. J. D.
„	Spivey, R.

Ordinary Grade Gas Engineering (Supply) (12)

First	Coates, A.
„	*Egan, D. G.
„	Goldsmith, L. W.
„	Mason, G. W.
„	Teale, J. R.
Second	Elvin, G. H.
„	Hollingshead, A. J.
„	Moon, R. H.
„	Rostron, M. J.
„	Stapleton, F. J.
„	Trowbridge, M. N.
„	Waite, E.

* *Denotes Distinction in the main subject.*

Gas Stocks Conversion

A further list of gas compensation values, published below, were issued by the Ministry of Fuel and Power on December 5. It covers 85 securities of 42 companies, most of which are smaller undertakings. The conversion will only add about £2 mill. to the amount of stock in issue, which is now £165.3 mill. Sufficient progress has been made with the valuation of gas securities which were not quoted on the Stock Exchange to estimate that nationalisation of the industry will cost the Government approximately £180 mill. for compensation, and possibly £185 mill. So far, 1,373 securities have been valued, together with 33 in composite companies, and less than 10% by value of outstanding stocks remain to be determined. Of these the only outstanding company of importance whose securities are unvalued is South Eastern Gas, and it is expected that about £15 mill. more Gas stock will be issued to cover the remaining 587 securities not yet valued.

Company	Compensation Value
Ammanford Ord. (£1 unit)	30/–
Barnstaple 4% Deb.	£102/10/–
Do. 4½% Red. Pref. (£10 unit) ...	£10/6/–
Do. 4% Red. Pref. (£10 unit) ...	£10/2/–
Do. 'A' (£10 unit)	£25
Do. 'B' (£10 unit)	£17/10/–
Bathgate Ord. (£1 unit)	49/–
Bideford 4½% Red.	£101
Do. 5% Cum. Pref. (£10 unit) ...	£11/4/–
Do. Orig. (£10 unit)	£26
Blandford 5% Pref. (£1 unit)... ...	22/8
Do. Ord. (£1 unit)	41/–
Bodmin Ord. (£1 unit)	39/6
Bridgend 4½% Deb.	£112/10/–
Do. 5% Pref. (£1 unit)	22/8
Budleigh Salterton 5% Pref. (£5 unit)	£5/12/6
Do. 4½% Pref. (£5 unit)	£5/9/–
Do. Ord. (Orig.) (£5 unit) ...	£10/5/–
Do. Ord. (Addl.) (£5 unit) ...	£7/5/–
Burnham Orig. (£5 unit)	£10/1/–
Do. Addl. (£5 unit)	£7/2/6
Chapel Whaley 4% Red. Deb. ...	£100/10/–
Do. Orig. (£1 unit)	19/6
Do. Addl. (£1 unit)	19/6
Clevedon and Yatton 4% Irred. Deb.	£102
Do. 5% Consol. Pref.	£113/10/–
Do. Consol. Ord....	£113
Colwall Orig. Ord. (£1 unit)	26/–
Do. Addl. Ord. (£1 unit) ...	26/–
Dawlish 5% Pref., before Jan. 1, 1946 (£1 unit)	22/9
Do. Ord. (£1 unit)	38/6
Derby 5% Pref.	£115
Epworth Ord. (£5 unit)	£6/5/–
Faversham 4⅓ Perp. Deb.	£102
Do. 5% New Pref.	£112/10/–
Do. Orig.	£215
Do. New Ord.	£168
Do. New	£168
Hathersage Ord. (£1 unit)	40/–
Hellifield Ord. (£1 unit)	24/6
Henley in Arden Ord. (£5 unit) ...	£1/5/–
Hessle 5% Red. Deb.	£103
Horsham 4% Irred. Deb.	£101/10/–
Do. 4½% Pref. (£10 unit) ...	£10/15/–
Do. Orig. Ord. (£10 unit) ...	£20/10/–
Do. Addl. Ord. (£10 unit) ...	£14/10/–
Houghton-le-Spring 5% Irred. Deb.	£125
Do. 4½% Red. Deb.	£105/10/–
Do. 6% Pref. (£10 unit)	£13/6/–
Do. Ord. (£10 unit)	£15
Ilfracombe 5% Pref.	£112
Do. 4% Red. Pref.	£101
Do. Consol. Ord....	£145
Kibworth Ord. (£1 unit)	40/–
Kidderminster 5% Pref.	£113
Kirton 5% Red. Deb.	£100
Do. Ord. (£1 unit)	28/–
Linlithgow Ord. (£10 unit)	£10
Market Rasen Orig. Ord. (£10 unit)	£17/15/–
Do. Addl. Ord. (£10 unit) ...	£12/10/–
Misterton and West Stockwith Ord. (£5 unit)	£10
Newhaven Orig. Ord. (£1 unit) ...	32/6
Do. Addl. Ord. (£1 unit) ...	32/6
North Western Gas Corporation Ord. (£1 unit)	30/–
Portishead 6% Pref. (£10 unit) ...	£13/6/–
Do. Orig. Ord. (£10 unit) ...	£19/10/–
Do. Addl. Ord. (£10 unit) ...	£13/13/–
Saltcoats Ord. (£1 unit)	50/–
Sandy Ord. (£5 unit)	£5
Shipston-on-Stour Ord. (£1 unit) ...	34/–
Skelmanthorpe Ord. (10s. unit) ...	10/–
Southwold 4½% Red. Deb., before Jan. 1, 1946 (£10 unit)	£10/2/6
Do. 6% Pref. (£5 unit)	£6/15/–
Do. Ord. (£5 unit)	£10
Stevenston Ord. (£1 unit)	37/6
Stewarton Ord. (£1 unit)	28/–
Titchfield 6% Addl. Pref. (£1 unit) ...	5/–
Do. Orig. Ord. (£1 unit)... ...	2/6
Wick Ord. (£1 unit)	30/–
Willenhall 4% Deb.	£102/10/–
Do. 5% 'B' Pref. (£2 14s. unit) ...	60/9
Do. 'A' (£5 unit)	£13/12/6
Do. 'C' (£5 unit)	£11/7/6
Do. 'D' (£10 unit)	£21/15/–
Do. 'E' (£5 unit)	£10/17/6

* The value of these unquoted securities has been determined in accordance with Sections 25 (10) and 26 (4) of the Act.

Gas Charges in the districts previously supplied by the former Inverkeithing Gas Company, which has now been merged into the Dunfermline district area of supply, will be reduced to a scale in accordance with the Dunfermline county, area rates. The present rate for ordinary meters of 5s. 4d. per 1,000 cu.ft. will be reduced to 5s. per 1,000 cu.ft. for the first 6,000 cu.ft. per quarter, and the remainder of consumption to 3s. 6d. per 1,000 cu.ft. Present rates for prepayment meters of 5s. 9d. per 1,000 cu.ft. will be reduced to 5s. 6d. per 1,000 cu.ft. for the first 6,000 cu.ft. per quarter, and the remainder of consumption to 3s. 6d. per 1,000 cu.ft.

Gas Staff Compensation

Opposition Criticism in Commons Debate

THE Commons debate on the Draft Gas (Staff Compensation) Regulations, 1949, which was held on November 30, evoked a number of criticisms from the Opposition in spite of the fact that the Ministry of Fuel and Power had already made concessions to meet objections put forward on previous occasions.

Mr. **A. Robens,** Parliamentary Secretary, Ministry of Fuel and Power, who moved approval of the Regulations, gave a short analysis of their content, a report of which was given in the *Journal* of November 9. He drew the attention of Members to a difference in the regulations as compared with those for the electrical industry which had been debated earlier in the year. This was the introduction of the element of expectation, which, he explained, had been brought in because of the differences between the gas industry and the industries for which regulations had already been made. In the latter, he continued, there was in operation a code which covered redundancy when amalgamations took place. No such general code existed in the gas industry, and the Government therefore had looked at what the gas industry did in the normal way when an amalgamation occurred. 'Whatever was done in those circumstances,' he said, 'we have incorporated in these regulations and made provision for expectation.' The regulations had been framed to alleviate hardship without discouraging the personal incentive to seek other employment, since they regarded it as absolutely essential to the policy of full employment that workers displaced from one industry should take all the necessary steps to obtain employment in another. They had therefore been 'weighted in favour of the older men who will find more difficulty in obtaining other employment than the younger men.' He concluded by reading from the editorial comment in the *Gas Journal* of November 9, which spoke of 'the genuine desire on the part of those who are now responsible for the conduct of the industry to give a square deal to those whose status has been rendered less favourable through no fault of their own.'

Labour Criticism

Mr. **T. W. Burden,** M.P. for Sheffield Park (Lab.), attacked this new principle of 'expectation of compensation.' It was, he claimed, 'a very serious departure from the code of compensation which has been previously accepted by this House in regard to all the industries and other services brought under national ownership and control.' He felt bound to call attention to the fact that it was also at variance with repeated declarations by Ministers in regard to this problem. 'I am advised that it will make a hotch-potch of conditions in the service. No one will know whether they have an expectation of compensation or not.' In answer both to Mr. Burden and to Col. **O. E. Crosthwaite-Eyre,** M.P. for New Forest and Christchurch (Cons.), who had asked for a definition of the term 'element of expectancy,' Mr. **Hugh Gaitskell,** Minister of Fuel and Power, assured the House that there was not much anxiety about persons who were entitled to compensation being left out.

Col. Crosthwaite-Eyre said that the Government had quite rightly set themselves a standard which they would try to maintain—the standard of model employers, and it was by that criterion that the regulations had to be judged. Compensation, he maintained, was something that must be full and complete. If it was to be fair it should not take account of class or rank or the level of emoluments. The Minister had no right to break away from what had been done in the past and to try to take into account outside facts. The Parliamentary Secretary had said that it did not matter too much, because there was full employment, and therefore whatever hardship there might be would be transient and temporary. The regulations had to stand for 10 years, and 'how does anybody know whether we shall still have full employment for 10 years?' The most dangerous appeal, however, was that in the matter of compensation the consumer must not be penalised. He was confident that the consumer did not want them to break with the past in order to save a few thousands of pounds, to cheesepare, and not to give a square deal to those who had worked for many years in the industry. Col. Crosthwaite-Eyre concluded by requesting the Minister not to disregard any emolument over £4,000, and quoted a number of cases of personal hardship under the regulations.

Mr. **Gaitskell,** concluding the debate, said, in answer to the number of personal cases raised, that provision was made for a referee to be appointed to hear appeals, and any case of that kind would be heard by him. In regard to the point on 'complete and full compensation' raised by the Opposition, it had to be remembered that any expenditure incurred would be paid for by consumers of gas, including workers in almost every industry, many of whom had nothing like the protection which would be accorded to persons in the gas industry under the regulations. The length of qualifying period was not, he believed, unreasonable. Certain concessions, as compared with some of the previous regulations, had been made. They had agreed to include the period of training so long as the man was in the gas industry beforehand. 'If we were to try to introduce an arrangement under which the period of training qualified, or was to be treated as part of the qualifying period, whether or not the man had been in the industry beforehand, we would have an extremely difficult situation.' In the case of gas it was not possible to point to anything sufficiently specialised from which one could be quite sure that a man was going into the industry. Asked whether time served as a pupil would count, Mr. Gaitskell said that if it was a period of training there was no doubt about it at all. The only other major point raised, he continued, was the objection to the £4,000 a year provision. The answer to that was very simple; the regulations were designed to deal with hardship, and were not dealing with contracts. 'We say that when it comes to a matter of hardship, if a man is going to receive £2,666 a year that ought to be enough to keep him going.'

The order was approved by 195—66.

THE BUILDING CENTRE

In future the Building Centre, 9, Conduit Street, W.1, will carry on its work under somewhat different circumstances. A change has been made in its management, a change calculated to ensure the Centre's permanence as a national institution, existing entirely for the benefit of good architecture and the encouragement of a high standard in building and equipment, with provision that its funds shall be used solely in those interests.

It appears that when the Centre was formed in 1932, with the approval of the Royal Institute of British Architects and other professional bodies, and with the support of most of the trade development associations and leading manufacturers, it was never assumed that if profits were made they should be distributed to any interested parties, but that any surplus should be used for the furtherance of good architecture and building in the broadest sense. Now, having successfully survived the hazards of the war, and finding itself the possessor of an international reputation (it is, in fact, the parent body of several centres overseas), and in a sound financial position, steps have been taken to create the new organisation which will take over the Building Centre's assets. It is to be reconstituted on a definitely non-commercial basis under a more widely representative Council of Management. It will continue under the same name as a company limited by guarantee, but with more restrictive Memorandum and Articles of Association so drawn up as to comply with the Board of Trade conditions for exemption from the use of the word 'Limited' from its title.

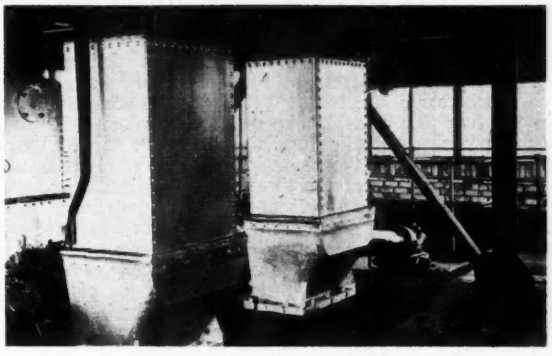
The new Centre will be governed by a Council of not less than 10 or more than 21 (including the President), which has the right to elect members or 'fellows' as they are termed in the Articles. The list of members who have so far agreed to serve on the first Council under the Presidency of Sir Giles Gilbert Scott, O.M., R.A., P.P.R.I.B.A., and the Directorship of Mr. F. R. Yerbury, HON. A.R.I.B.A., contains several names familiar to the gas industry, including Sir Alfred Hurst, K.B.E., C.B. (late chairman of the Centre), Mr. G. Grey Wornum, F.R.I.B.A., and Dame Caroline Haslett, D.B.E., COMP.I.E.E.

The former Centre's activities were wound up at the end of last month, and the new Centre has now taken over the fully equipped exhibition, with its premises and staff, free of all liabilities other than to its exhibitors. Continuity of policy is assured by the fact that 14 members of the former Board are members of the new Council.

'Our Aim—Extended Public Service'

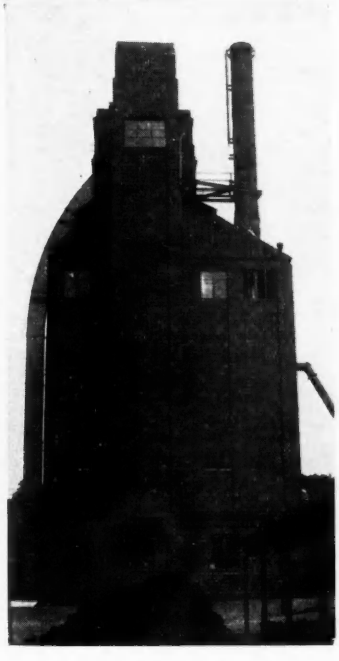
Sir John Stephenson at Saffron Walden Inauguration

THE first major installation to be completed within the territory of the Eastern Gas Board since the industry was nationalised, a set of six upwardly heated, Woodall-Duckham continuous vertical retorts—was inaugurated recently by the Mayor of Saffron Walden, Alderman C. Brightwen Rowntree, B.A. The Mayor was introduced by Sir John W. Stephenson, C.B.E., J.P., Chairman of the Eastern Gas Board, and among those who attended were Mr. J. H. Dyde (Deputy Chairman, Eastern Gas Board) and Mr. J. Hunter Rioch (General Manager, Cambridge Division), together with officials of the board, the general managers of the Norwich, Ipswich, and Watford Divisions, the group engineers of Cambridge, Bedford, and Peterborough, aldermen and councillors of the borough, and representatives of the municipal, commercial and industrial interests of Saffron Walden.



A view of the coal measuring boxes at the top of the setting. The window space in the background is indicative of the light and well ventilated character of the retort house.

In his opening remarks Sir **John Stephenson** paid a warm tribute to the Borough Council for the foresight and careful consideration which had been exercised over a number of years in the planning and construction of the vertical retort installation. Not all local councils and others in control had been thinking ahead so successfully. The output of gas had grown from 39 mill. cu.ft. in 1935 to 59 mill. in 1946 and to 71 mill. in 1948, which led Sir John to comment: 'It is quite clear that the decision taken was not only wise, but in the best traditions of this remarkable area.'



The new retort house.

Before performing the opening ceremony the Mayor, Alderman **C. Brightwen Rowntree,** described how the Saffron Walden gasworks had developed since 1836, when a private company with five trustees was formed. The present project was conceived by Councillor F Goddard to whose initiative and inspiration together with that of the Engineer, Mr. W. White, the new installation was very largely due.

At the luncheon which followed the toast of 'The Borough of Saffron Walden' was proposed by Mr. **J. H. Dyde.** In congratulating the Woodall Duckham Company and all concerned on the retort installation, which he described as a first class engineering job, Mr. Dyde declared that their action in spending £40,000 on the plant was evidence of their faith in the project.

'I am sure,' he added, 'that the residents of Saffron Walden need have no fear about the supply of gas to the borough, providing we can get the necessary raw materials for the retorts. This is one of the biggest municipal progresses in the history of the borough and is a credit to the Mayor, the Council and its officials.'

Responding to the toast, the Mayor said: 'We look forward to the future and to the favours we hope to receive from the gas board.'

The health of the guests was proposed by Mr. **J. Hunter Rioch**, who made reference to the 'lusty and promising infant' whose christening they had attended. 'The new plant,' he said, 'is a further addition to Mr Therm's already large and flourishing family and I am certain he will be very happy in this pleasant town which has adopted him.' He gave an assurance that it would be the aim of the board to maintain the public goodwill which had been earned in Saffron Walden through the years by continuing to give efficient service to consumers 'We are very conscious,' he said, 'that the achievements of the past are a challenge to those chosen to carry on this great industry. Team spirit and the maximum co-operation of all is essential if we are to be worthy of the great charge to which we have been called by the nation'

Mr. **G. Nunn,** Chairman of Saffron Walden Rural District Council, who replied, said that the board was very much in the position of a trustee, and Councillor **G. T. Barnard,** present Chairman of the Town Council's Gas Committee, in proposing a toast to the Chairman of the board expressed the hope that 'you will preserve, to the utmost of your ability, the intimate and friendly spirit of co-operation which has always existed between the producer and the consumer.'

The **Chairman,** in acknowledging the toast, said the board had one aim only—extended public service. 'There is one thing we are determined to do, and that is to decentralise as fully and completely as possible,' he said.

The New Installation

The new installation consists of six upwardly heated, Woodall-Duckham continuous vertical retorts having a major axis of 44 in. and set in independently controlled units. The retorts are heated by means of two step grate producers situated at ground floor level at one side of the retort bench. Thirty tons of coal can be carbonised daily, and nearly half a million cu.ft. of gas produced per day. The installation includes a complete coal and coke handling plant, and is enclosed in a steel framed, brick panelled building of the latest design.

Two transverse, air cooled division walls divide the bench into three sections, each containing two retorts. By this arrangement any one section can be heated up or let down without interference to the working of the retorts in the other sections, while the settings are so constructed that the heating of each retort can be controlled independently of the others.

Beneath the coke extractors at the bottom of the retorts, auxiliary coke hoppers receive approximately two hours make of coke which can be discharged either into a bottom discharging skip for delivery to the producers or into a barrow for delivery to storage.

The skip containing coke for the producers is elevated by means of an electric lift to the producer charging floor where the skip is run out on to a track laid on top of the producers and the coke discharged directly into the producer charging holes.

Fuel Policy

From Our Own Correspondent

LAST month Dr. A. C. Dunningham delivered his presidential address at the second meeting of the fifth year of the North Western Fuel Luncheon Club. in the founding of which he was the moving spirit. His three predecessors (Sir Frederick J. West, the founder-president, occupied the chair for the first two years) had been representative of the three main fuel industries, gas, electricity, coal. He represented a large and enlightened consumer (the I.C.I.) which for many years had collected as much information as possible about coals, their composition and properties, their occurrence, production and preparation, information they had always considered necessary to enable fuels to be selected to the best advantages for the various purposes to which they were to be put. He had been associated with Dr. Grumell in much of this work over the last 20 years and he devoted his address to a brief review of the changes which had taken place in that period in the production of coal and of our knowledge of its composition and properties and in its utilisation.

Discarding any intention of entering into political controversy he expressed the opinion that there was considerable justification for the nationalisation of the coal industry. It was unfortunate that the subject of nationalisation of other industries for political rather than factual reasons, together with the general unrest in the labour world, had tended to prejudice public opinion and to obscure the very real advantages which might be expected to result in the case of coal. The industry had consisted of over 2,000 units operating independently, fiercely competitive in home and export markets. With little or no co-ordination in technical and scientific matters methods of production had been dictated by competitive rather than technical considerations to the detriment of national economy and leading to waste of this our most valuable national asset. Coal was often sold at cut prices, many concerns were on the verge of bankruptcy, while wages had been forced down to a level far too low for men engaged in so important and dangerous an occupation. Under the quota system of the 1930 Act prices tended to be based on costs at the least efficient mines. The remedy provided by this Act was only temporary and far from satisfactory. The National Coal Board, therefore, inherited many difficulties but was also presented with a great opportunity. There are risks of over centralisation with the stifling of local initiative, too great a degree of standardisation may be attempted, but there was equally great danger in the extreme decentralisation prior to nationalisation.

Costs and Output

The average figures as published of costs and output entirely conceal the wide variation among individual units. These differences may be attributed to differences in geological structure, the degree to which the field has been worked, and similar factors, but it is not unreasonable to suppose that the gaps between the divisions could be narrowed by improvements in working methods and equipment. Even divisional figures may be misleading because they give no indication of the extremely wide variations between pit and pit. Each mine has its peculiar difficulties but existing differences in costs and output cannot be due entirely to natural causes. An examination of the performance in detail in each mine must be a lengthy business. Dr. Dunningham understood it was being undertaken by the Board and he believed there were very great possibilities of savings. Wages constitute about 66% of the total cost of production and it was usual to stress the possibilities in increased mechanisation. A careful examination, however, of published data showed that output per man-shift had increased little in the last 30 years though the percentage of coal cut and conveyed by mechanical means had increased from 30 to over 70 in that time. It seemed fair to conclude that the increase of mechanisation over the last 20 years had been largely absorbed in overcoming the increasing difficulties of working thinner seams, arising out of the gradual exhaustion of the coalfields and in reducing the working hours and physical effort of the miners.

Comparison between British and American conditions in this respect is dangerous because geological and working conditions differ widely. But Sir Eric Young had, last year, shown that whereas American miners earn 75s. per shift as against the 28s. of the British miner, the wage cost of coal in America was only 16s. there as against 26s. in Great Britain. Dr. Dunningham suggested that these figures indicated that the American miner has accepted the machine, using it to increase his output and his earnings, while that is far from being the case with the British miner. It was of interest to recall the remark of Professor Beacham at the British Association in Newcastle last year that over-production and redundancy might face our coal industry in the course of the next few years, because it was possible that the production target might be reached without a reduction in costs which might be too high to compete in the export market.

The Intractability of Institutions

Arnold Toynbee had pointed out how often civilisation had been threatened by the 'intractability of institutions.' New ideas and new knowledge are too often not accompanied by a new outlook. We are, just now, trying to to fit a welfare system with guaranteed social security into a world where men are still thinking that increased production leads to unemployment and fail to realise that benefits involve responsibility. This is not peculiar to the coal industry; it is a characteristic of our times. We can only hope that the efforts of the Coal Board, its managers, technicians, and scientists, may not be frustrated by this intractability in the human outlook.

We were on much surer and less contentious ground when we turned to the subject of the very great increase in our knowledge of coal which had taken place in the last 20 years. In the last 25 years a comprehensive physical and chemical survey of our national coal resources had been carried out by the Fuel Research Board and the results published in nearly 60 technical reports. These go a long way towards providing a broad and comprehensive picture of our national coal deposits. It is doubtful, however, whether until very recently the results obtained in the various coalfields were fully correlated. The N.C.B. has taken over the Fuel Research Board's Regional Survey Laboratories and is now engaged on analysing and classifying all the coals which it produces. This scheme of classification will, when completed, place all coals into eight or nine broad groups according to rank and should convey to the purchaser a very good indication of the properties of the several classes of coal and their behaviour when industrially applied. Another great advance in classification is that of the adoption by the Board of the recommendations of the Size Grading Committee, substituting eight nomenclatures for the several hundred different nominal sizes formerly marketed.

This careful examination of our coals has been greatly assisted by the standardisation of methods of sampling and analysis. Without such standard methods producers and consumers had no common basis on which to compare results. There was a time not so many years ago when determinations of the calorific value of identical samples of coal led to wide disagreement between constituent divisions in Dr. Dunningham's own company and reliance upon information from outside sources was often impossible. The Fuel Research Board had done excellent work in this connection. Its Technical Paper No. 44 on 'The Methods of Analysis of Coal and Coke' is still a classic. Many of its methods have been embodied in the B.S. Specifications.

Developments in Combustion

Equally great developments have taken place in connection with the combustion of coal and its industrial use. His own company had contributed largely to the elucidation of the factors affecting combustion, particularly on travelling grate stokers as used in water-tube boilers. The British Coal Utilisation Research Association, under the able direction of Dr. Ritchie and Mr. Gunn, had extended this work by large scale tests on shell boilers. Mr. Hurley, at the Fuel Research Station, using a hand-fired Lancashire boiler, had shown the quantitative effect on efficiency of both an excess and a deficiency of excess air. 'He has established beyond doubt

that the emission of smoke is accompanied by unburnt combustibles in sufficient amounts to reduce boiler efficiency very materially, the reduction being as high as 14% with very black smoke.' Mechanical stokers (the latest of the chain grate type) are being increasingly applied to shell boilers while the application of the spreader stoker to the water tube boiler marks a similar revolutionary advance.

These developments had made possible thermal efficiencies beyond which little further advance can be hoped. They had also very largely extended the possibilities of using low-grade fuels. This is a matter of very great importance for it is impossible to clean many coals without involving the loss of combustible matter and the production of graded, low ash coals is inevitably accompanied by the production of low grade coals. Provided prices are suitably adjusted there is little doubt that modern technical advances will make the use of these inferior grades economically possible. From a national point of view it is important that a balance should be struck between the loss involved in the cleaning of coal and that in using it in an uncleaned state. This problem should find a satisfactory solution in the adoption of a rational price structure.

Dr. Dunningham referred briefly to the provisions for the training of fuel technologists, combustion engineers, and stokers. The incentive to learn on the part of lower grades would be much greater if certificates of proficiency were issued to stokers and firemen, completing courses satisfactorily, and higher wages paid to those holding them. The greatest step forward in the training of higher grades had been the grant of a Royal Charter to the Institute of Fuel whereby the status of a properly qualified fuel technologist had been raised to that of a profession.

A Criminal Waste

Although many great advances had been made in our knowledge of coal and its utilisation and in the design of coal burning equipment, it was still unfortunately true that we are still almost criminally wasteful in the use of our great national asset. Attention had been focussed upon the more efficient use of coal by the Fuel Efficiency Committee set up under the chairmanship of Dr. Grumell by the Ministry of Fuel and Power. As a result there had been a progressive realisation of the waste which is taking place and considerable progress made toward its reduction.

The position had been stated very clearly by Oliver Lyle in his paper entitled 'Inefficiency' in which it had been shown that the average efficiency of usage of coal in this country is of the order of 20%—a figure which had never been seriously challenged. It means that four-fifths of the coal we raise with such difficulty from the bowels of the earth is wasted by useless dissipation to the surroundings.

The blame could be laid at no particular door. The average efficiency of both the open domestic fire and our great industrial power stations is about the same, 20%, but the reasons for these low figures are different. From the coal fire 80% of the heat is carried up the chimney by excess air; in the power station, nearly 50% is lost in cooling towers and condensers. Means are now available by which the latent heat thus at present lost could be recovered as low grade, pass-out steam from back pressure turbines and used for process or domestic heating.

Central power stations burn about 28 million tons of coal per year and the savings which could be made if the overall thermal efficiency were raised from 20% to 70% are so great that it is reasonable to ask why all the great new power stations now being erected are of the condensing type. Of the many difficulties in the way of a change in this respect the chief is the necessity of siting power stations where there is an economic outlet for low grade steam either for process or for district heating.

The Fuel Efficiency Committee had rendered a great national service in pointing out the many examples of heat losses in industrial plant. It had issued a most valuable series of bulletins and had been responsible for the publication of two classic text-books on efficiency in the use of fuel and of steam.

The days of cheap, plentiful coal had inevitably and irretrievably gone. 'We are in a new world and must make the best of it. It is a challenge to which our response will determine our fate and that of our nation.' There was little doubt that great economies can be made with comparatively little effort or expense by the application of existing knowledge. 'By a joint effort of producers and consumers we can turn our apparent misfortune into a great opportunity for the benefit of ourselves individually and of the nation as a whole.'

NEW HOUSING MANUAL

*The Housing Manual, 1949,** which has been prepared by the Ministry of Health, in consultation with the Ministry of Works, and sent to all local authorities in England and Wales offers further advice to those concerned with the provision of housing accommodation. It is the product of four years' experience in post-war house building and embodies the results of research in technique and methods.

In general, the standards recommended in the Manual are those proposed by the Design of Dwellings Sub-Committee of the Central Housing Advisory Committee. Publication of the Manual will be followed by a companion volume being prepared by the Ministry of Works—the *Technical Appendices to the Housing Manual, 1949*—and by advice from the Ministry of Town and Country Planning on the planning of residential neighbourhoods. The Manual therefore confines itself to questions concerning the selection of housing sites, the lay-out, design and equipment of dwellings, and standards of accommodation.

The Manual states: 'A marked difference of emphasis in regard to types of houses will be observed as between this Manual and its predecessor of 1944. It was then considered that in the period immediately after the war the most urgent task would be to provide homes suitable for the younger families who, by reason of war conditions, had been unable to obtain a separate home of their own; the needs of these families with their varying numbers would, it was thought, be most appropriately met by the parallel provision of two-bedroom temporary houses and three-bedroom permanent houses. In the Manual of 1944 emphasis was, therefore, laid primarily on the provision of three-bedroom, two-storey houses.

'The long-term housing problem calls, however, for a much greater variety of types of houses, some larger, some smaller, than the normal family houses, in order to meet in a balanced way the varying requirements of the population as a whole. An endeavour has, therefore, been made in this Manual to cover a far wider field than was covered by the Manual of 1944. The size and type of dwellings suited to the needs of a particular community are best determined by the Housing Authority in the light of local circumstances and their intimate knowledge of local housing conditions.'

Chapter 5 of the Manual deals with heat installation, and recommends facilities for maintaining the living room at a temperature of 65°F. with background heating (45-50°F.) throughout the house. In order that the heating standards can be met economically, the main space and water heating load should be taken by a solid fuel appliance; gas and electricity should be used for intermittent and auxiliary services. Emphasis is placed on developments which have occurred in solid fuel appliances, full details of whose performance standards will be published in the Technical Appendices. Space and water heating, the Manual states, can be most efficiently supplied in blocks of flats from a central plant, and 'when new estates of more than 100-200 houses are being developed the possibilities of district heating may well be worth considering.' There are, however, 'strong reasons for designing district heating or central heating systems to provide the full space heating and hot water requirements and not only a part of them.

Finally, the Manual recommends that 'where both types of fuel (gas and electricity) are available at comparable cost, in order to allow some freedom of choice by the housewife, housing authorities should provide for some of the houses to be serviced by gas and some by electricity. The proportion of each type must be determined in the light of local circumstances.'

* H.M. Stationery Office, York House, Kingsway, W.C.2, Price 3s. 6d., post free 3s. 9d.

The Councils of the Institutions of Civil, Mechanical and Electrical Engineers have decided to hold in London a Joint Engineering Conference from June 4-15, 1951, to coincide with the Festival of Britain. The theme of the conference will be to place on record the achievements of British engineers and will afford an opportunity for international engineers to discuss the future development of the world sources of power. The conference will also underline the interdependence of all branches of engineering and will discuss the development of the system of education of engineers in Britain which, by the achievement of British engineers has shown itself to be pre-eminently suited to the conditions in this country.

Hard Water and Industry

THE Water Softening Sub-Committee, which was appointed by the Minister of Health in 1946 to investigate the desirability of softening public water supplies in hard water areas, has now issued its report.* Its consideration of the economic and personal disadvantages of both temporary and permanent hardness has resulted in the following general conclusions:—

(i) In regard to the effect of scale deposition, it is not thought that the softening of water supplies would effect any considerable economy in fuel, though it would save expense in scale removal.

(ii) Although few, if any, industries would object to softened water (depending, however, upon the process of softening) and in some instances it would be of some value to them, it seems clear that in general softened water would not be worth to industry industry's share in the cost of producing it.

(iii) It is therefore considered that undertakers already softening their supplies are doing a service to the community which is well worth the cost. Undertakers supplying hard water and so situated as to carry out water softening at a reasonable cost should be encouraged to plan to do so as soon as labour and materials can be spared from more urgent matters. They should reserve their final decision until the last moment so as to be able to consider the latest developments.

The Sub-Committee worked in close co-operation with a representative number of water undertakings, and as a basis for their findings attempted to ascertain the proportion of householders in England and Wales who are supplied with waters of varying degrees of hardness. Sources of error have been confined to small or medium sized undertakings, and the figures, which are probably the first authoritative analysis to be published, indicate that some 45% of the population receive water which would be described as hard or very hard; 5% receive water of the very hard class. It is of interest also that both undertakers and local authorities supplying hard water reported to the Sub-Committee that the public emphasised in their complaints the excessive scaling of water heaters and boilers, and the cost and inconvenience of frequent descaling operations.

Scale and Fuel Consumption

The effect of scale on efficiency and fuel consumption has been studied in some detail in an appendix to the report. The report confirms the view expressed by the Ministry of Fuel and Power in its publication of 1946, 'The Efficient Use of Fuel,' that while 'older figures for heat loss due to scale range up to 15% loss for $\frac{1}{16}$ in. of scale, the actual loss is not more than 2%.' The latter figure is supported not only by theoretical calculations, but also by the result of experimental investigations. This conclusion modifies to some extent the emphasis which has hitherto been placed on the savings in fuel consumption which can be achieved by descaling, or alternatively by water softening, and reduces the validity of former scale thickness/fuel consumption figures, as quoted, for example, in 'Hardness of Water, Its Bearing on Water Heating,' by Dr. Bernard Friedman. The Sub-Committee summarises that: 'Although it cannot be said that scale production does not lead to increased fuel consumption for water heating, the percentage increase is not very large, and we do not think that it can exceed 10%. Even this, of course, is of importance since it corresponds to half a million tons of coal per annum in the hard water areas in this country. Nevertheless, we have come to the conclusion that for the average person the disadvantage of scale formation lies in the damage it causes to heating appliances and the cost and trouble entailed in its removal rather than in the waste of fuel it may cause. On this point, too, it must be mentioned that the softening of water, while it might reduce or eliminate the wastage of fuel due to scale formation, would not, in fact, mean that all this fuel was saved. The softening process requires the use of lime, soda, salt, in the manufacture of which fuel is consumed.'

Close consideration has been given to the use of domestic water softeners as an alternative to the softening of public water supplies before distribution. It is recognised that these appliances were marketed with some success in hard water areas before the war and have been in greater demand since soap rationing, but, it is stated, they are expensive and only a small minority of householders have purchased them. There is 'no evidence that purchasers do not believe them to be worth the cost,' but the report mentions that if all householders in hard water areas were to provide themselves with soft water by domestic softeners of the mains type the total capital cost would probably exceed £100 mill.

Effective Boiler Efficiency

The increasing load on gasworks plant has demanded in recent years that the boilers should be kept in service for the highest proportion of their working life with maximum thermal efficiency; recognition is given to this aspect of industrial water treatment in the appendix on scale formation, which states: 'The prevention of scale formation by adequate chemical control would be sound economics even if boiler efficiency were the sole consideration. There is, however, another factor which is growing in importance as boiler pressures and rates of driving steadily increase. This is the failure of tube surfaces due to overheating as the result of scale formation.' The need for quality in cooling water is also recognised, but the Sub-Committee is of the opinion that the advantages of a soft water for cooling purposes would not be worth the 3d. per thousand gallons it is likely to cost to produce at a waterworks, and that an industry which uses large quantities of it for this purpose would protest vigorously against paying for it.

As fas as industry in general is concerned, it might be thought, the report continues, that the thousands of industrial water softening plants in factories in the hard water areas might be dispensed with if the public supply were softened. This, however, would only rarely be the case since the degree of softening required in boiler feed water is greater than could normally be effected by the water undertaker. At the most, therefore, all that the central softening would do would be to reduce the amount of reagents required and the quantity of waste product, be it slime or base exchange effluent, to be disposed of in the works. Since the cost of reagents and disposal of waste is by no means the whole of the cost of softening it seems that the manufacturer would normally lose financially if required to pay the whole cost of central softening. Moreover, particularly with high pressure boilers, the preparation of feed water is a complex matter and the availability of even a perfectly soft water would not eliminate the necessity of some treatment. 'It can fairly be said then that with some exceptions central water softening is unlikely to benefit either the facility or cost of productive industry.' The report therefore recommends that in deciding whether to soften a particular supply the proportion of that supply consumed by industry must have an influence on the decision. 'It is a matter for argument,' the report concludes, 'whether the domestic user, since he reaps a greater benefit from softening, should pay the greater proportion of the cost.'

* Water Softening. Report of the Water Softening Sub-Committee of the Central Advisory Water Committee. H.M.S.O., price 1s. 6d.

Brierley Hill Urban District Council has a new chain of office for its chairman. It is the gift of the former Dudley and Brierley Hill Gas Company, to mark the happy relationship which existed for many years between the Company and the Council. The chain was handed over by Mr. G. Alan Thompson, Chairman of the Gas Company, to Councillor W. H. Southall, Chairman of the Council.

The British Standards Institution has recently published British Standard 1591, acid-resisting high silicon iron castings. This standard covers the requirements for acid-resisting high silicon iron castings for chemical engineering purposes. The chemical composition of the castings and the procedure for chemical analysis are specified. Details are also provided relating to heat treatment, freedom from defects, porosity, repairs to castings, welding, marking and packing, inspection and testing facilities. Copies of the standard may be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, price 2s., post free.

TREATMENT OF EFFLUENT LIQUORS FROM GASWORKS*

By JAMES J. PRIESTLEY, M.Sc., M.Inst.Gas E., A.M.I.Chem.E.,
W. C. Holmes & Co., Ltd.

(*Continued from page 600*)

SOLVENT recovery by distillation is an additional steam charge which does not appear if benzole is used as a solvent. In spite of this, however, the steam requirements of a butyl acetate dephenolation plant are less than those of a benzole dephenolation plant of equal capacity.

(iii). Description of Phenol Recovery Plant, Bolsover.

The two plants under construction are for the Bolsover and Askern works of Low Temperature Carbonisation, Ltd., to which brief reference was made by the late Colonel Bristow (20). Both plants are identical in design and have a capacity of

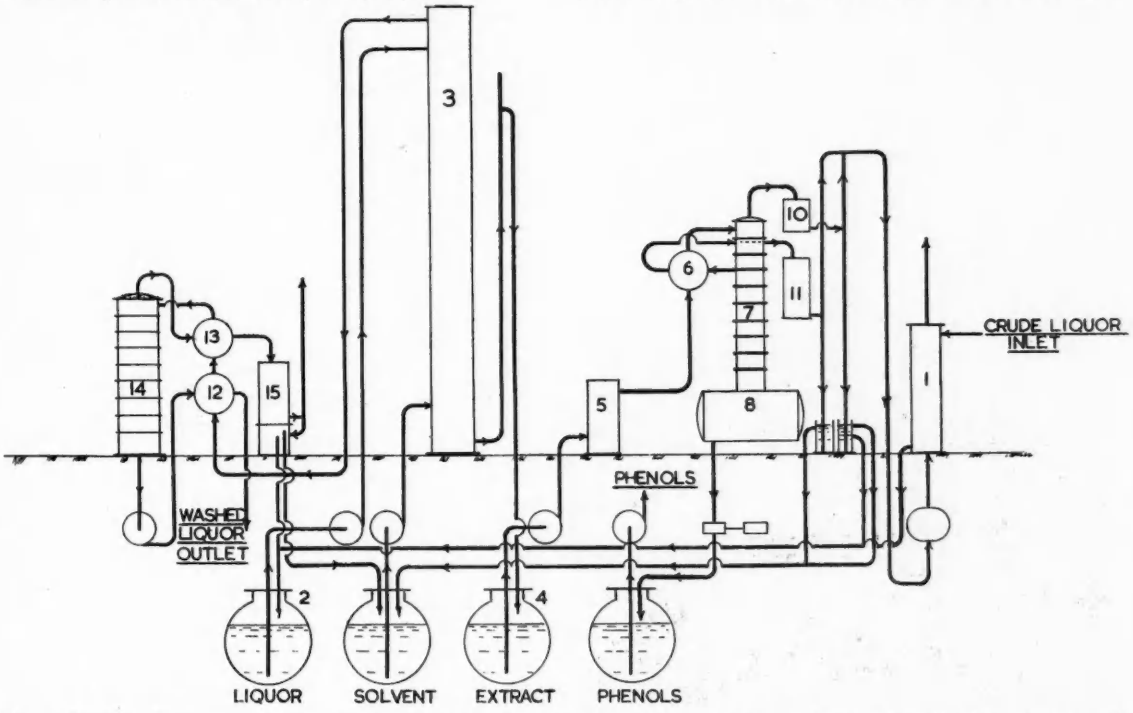


Figure 3.—Phenol recovery plant. In this diagram the dephenolated liquor is shown leaving the phenol washer near the top of the tower, and the butyl acetate extract from the bottom and then through a variable head device. This should be the other way round. The dephenolated liquor should go through the variable head device and the butyl acetate extract leave direct from the top.

(c). *Influence of pH.* The efficiency of phenol extraction is improved by reduction of the pH of the liquor, but this effect is considered negligible in practice. The German plants were fitted with a 'degassing tower,' as the BIOS report describes it, for treating incoming liquor with carbon dioxide for pH reduction. In view of this, experiments were made on effluent liquors artificially made from a vertical retort liquor from works S. One sample was stripped entirely of free ammonia and the other of 90% only. These samples, which had pH values of 5.1 and 8.4 respectively, were batch washed with butyl acetate. The results are shown in Fig. 2 which show that, although definite, the influence of pH is small.

(d). *Solvent Hydrolysis.* It is possible that the deliberate pH reduction practised in Germany was for the suppression of ester decomposition by hydrolysis into acetamide. The BIOS report estimates that hydrolysis was responsible for one third of the total loss of solvent of 0.25 gal./1,000 gal. liquor. Steps have been taken therefore in the design of plant to minimise the contact of solvent with water, except, of course, in the washer itself, where maximum contact is arranged for efficient phenol removal. Experiments made on the hydrolysis of butyl acetate gave the results shown in Table 4.

*Paper to the Scottish Junior Gas Association (Western District), November 18, 1949.

1,250 gal. crude liquor per hr.

Reference should be made to Fig. 3, which is a simplified flow diagram of the plant. Crude liquor from storage enters the plant by first passing down a ring packed vent scrubber 1, on its way to the crude liquor storage tank 2. The purpose of the vent scrubber is to minimise the loss of solvent, as all plant vents are brought to it and any butyl acetate vapours are dissolved there by the descending incoming liquor.

TABLE 4.

Hydrolysis of Butyl Acetate in water solution by free ammonia, NH_4OH.

	At 20° C.	At 75° C.
Ammonia concentration at start	0.95 N	1.02 N
Butyl acetate concentration at start	0.8 gm./100 c.c.	0.8 gm./100 c.c.
Butyl acetate concentration after 2 hr.... ...	0.37 gm./100 c.c.	0.44 gm./100 c.c.
% hydrolised	53%	45%

Crude liquor from the storage tank 2 is pumped at a fixed rate into the top of the phenol washer 3, at the same time solvent is pumped in at a fixed rate to the bottom. Actual rates are: liquor, 1,250, solvent 160, gal. per hr. Here the liquor and solvent are brought into intimate contact while passing through each other; the phenols are dissolved by

the butyl acetate which passes out from the phenol washer near the top and the dephenolated liquor near the bottom.

Considering first the phenol/butyl acetate solution ('extract') this overflows to an extract tank 4, from which it is pumped, first through a filter 5, next a vapour/extract heat exchanger o to the top of the cast iron bubble cap column 7. The upper part of the column is the dehydrating section where dissolved water is rapidly evaporated, together with a fixed quantity of solvent. The vapour composition from an extract containing 30% of phenol was experimentally determined in the laboratory. At atmospheric pressure, boiling started at 89.6°C., which remained constant until all the water had evaporated. The azeotropic mixture contained:

Water, 2.4% of original volume of wet extract, by vol.

Butyl acetate, 6.8% of original volume of wet extract, by vol.

Returning to the description of the plant. the dehydrated extract passes down the column into the stripping section and reboiler 8 where the butyl acetate is distilled off. Both sections of the column have their own condensers, 10, 11, but the butyl acetate from the stripping section passes through the vapour/extract heat exchanger 6 prior to the final condenser. Phenols are drawn from the reboiler by a pump, cooled, and passed to storage. The whole of this plant operated under a vacuum of 10 p.s.i. (5 p.s.i. absolute pressure) in order to obtain the necessary temperature head between the steam in the reboiler tube nest and the boiling extract.

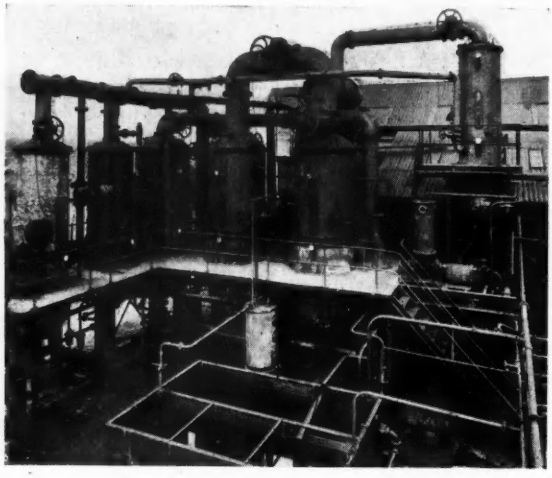


Fig. 4.—Multiple evaporation plant, Corby.

Considering now the dephenolated liquor. This holds about 0.8% of butyl acetate in solution which now has to be recovered by distillation. From the phenol washer the liquor passes through a series of heat exchangers, 12 and 13, to a ring packed still 14, where approximately 2% of the original volume of wet liquor together with the butyl acetate are distilled off. The vapours are condensed and separated, 15, the butyl acetate going to stock and the liquor back to crude liquor storage. The stripped liquor, after heat exchange and final cooling is discharged to waste. As low temperature liquors contain virtually no ammonia the problem of ammonia disposal does not arise on the Bolsover and Askern plants.

As has been mentioned, all vents on the plant are led to the vent scrubber which is irrigated by the incoming liquor. Any permanent gases are taken off and passed through iron oxide purifiers, to remove hydrogen sulphide, before ultimate discharge to the atmosphere.

(iv) Adaptation of Plant for Gasworks Operation.

The plant just described could be adapted without major alteration for gasworks operation. The most marked contrast between high and low temperature carbonisation liquors is in the ammonia content. Low temperature liquors contain virtually no ammonia; therefore on the Bolsover plant no provision had to be made for it. If we now consider solvent extraction at a gasworks, the operation may be carried out either before or after distillation of the liquor, but it is better to do it before for the following reasons:—

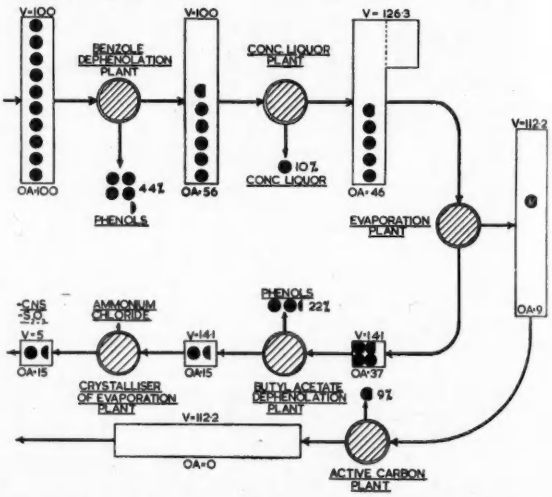
(a) More monohydric phenols are recovered, because during ammonia distillation about half of them are driven off in the vapour, being volatile in steam.

(b) The phenol recovery plant is smaller, because it has not to handle the extra water volume due to steam condensed during distillation.

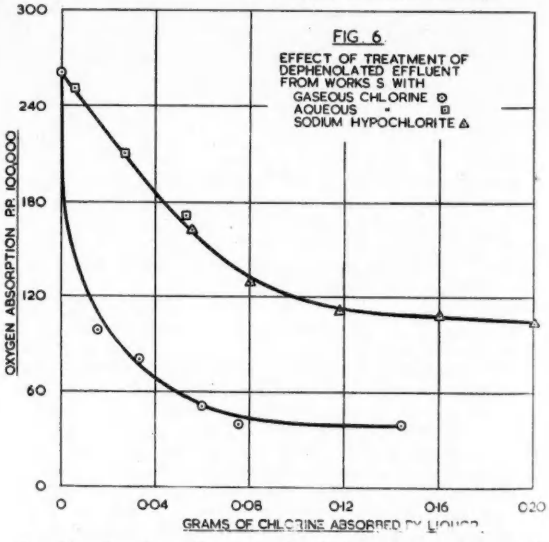
(c) A double heating is avoided, thereby economising steam.

TINGLEY EFFLUENT TREATMENT SCHEME FIG.5.

WHITE RECTANGLES REPRESENT LIQUOR VOLUMES. EACH BLACK CIRCLE IS 10% OF ORIGINAL O/A



The last point requires some explanation. Suppose we decide to dephenolate the still effluent. The crude liquor is drawn from storage, heated in the liquor plant heaters, distilled, and the effluent discharged hot. This must now be cooled, sent to the phenol plant for dephenolation, and then heated again for the recovery of dissolved butyl acetate, then cooled at at least 110°F. ((4) p. 34) before discharge. Notice the liquor must be heated and cooled twice, which, even with the use of heat exchangers, is better avoided.



Consider the alternative—*i.e.*, the dephenolation of the crude liquor. Liquor is drawn from storage, passed through the phenol washer, then heated to about 90°C. for the recovery of dissolved butyl acetate. Here a complication arises, because of the presence of ammonia, which will be evolved along with the butyl acetate and incidentally will tend to hydrolise

it. Laboratory investigations are being made on the effective separation of butyl acetate and ammonia.

The line being investigated is to pass the dephenolated liquor into a 'solvent stripper,' a small ring packed column resembling a small dissociator, and to find out under what conditions all the butyl acetate but little ammonia are evolved. The treated liquor would then pass forward for distillation, either through a normal dissociator if concentrated liquor is being made, or direct if sulphate of ammonia were being made. The vapours might be passed into a vent scrubber where the butyl acetate would be dissolved by the incoming liquor, as on the Bolsover arrangement.

(2) Complete Effluent Disposal

(i) *Tingley Scheme.* The scheme described by Nicklin (16) is probably the most comprehensive scheme of effluent disposal yet suggested and is considered to be better than the Corby scheme. It is a solution of the problem of effluent disposal from a large new works, sited away from large centres of population, where the cost of treatment by sewage authorities is prohibitive. It is claimed that not only will the plant pay its way but actually produce a revenue. Two such plants are being installed by Holmes, at the new gasworks at Tingley, near Leeds (North Eastern Gas Board) and Denton, near Manchester (North Western Gas Board).

The novelty of the Tingley scheme is not in any of the constituent plant units, which, save one, are all well tried and orthodox, but in the combination of these units. The scheme may be summarised as follows and is shown diagrammatically in Fig. 5.

(a) *Benzole Dephenolation Plant.* Crude liquor is treated in a benzole dephenolation plant, similar to those at Partington and Glasgow, for the removal of monohydric phenols.

(b) *C.A.L. Plant.* Dephenolated liquor is subject to distillation for the production of a concentrated ammonia liquor.

(c) *Evaporation Plant.* Still effluent is evaporated to one-tenth of its volume in a quadruple effect evaporation plant (similar to Corby & Partington).

(d) *Butyl Acetate Dephenolation Plant.* The concentrate from the third effect of the evaporation plant is cooled and washed with butyl acetate for the removal of higher tar acids after which the concentrate is evaporated for the production of ammonium chloride. Thiocyanates and thiosulphates remain in the mother liquor.

(e) *Active Carbon Plant.* Condensed vapours from the evaporation plant pass through an active carbon plant (in effect a 'catch box') for the removal of any phenols which may have slipped the benzole dephenolation and C.A.L. plants. Such condensate, being virtually distilled water, may be used as boiler feed water. Dephenolated stripped liquor is used for ammonia removal instead of water.

It is fairly easy to forecast the O/A reduction on various phases of this process from the known performance of existing plants. On the other hand it is difficult to obtain precise results on a laboratory scale with a given liquor which will simulate the results which will be obtained on the whole scheme. Experiments have been made, however, and the results compared with Nicklin's calculated figures, and on the whole good agreement is shown.

TABLE 5.

TREATMENT OF LIQUOR FROM WORKS B.

	Intermittent vertical chambers: O/A removal (vol. × O/A as % of original volume × O/A)	
	Calculated	Observed
	%	%
By benzole D.P.	44	59.5
By liquor concentration ...	10	4.5
By evaporation	9	13.6
By butyl acetate	22	5.3
Mother liquor	15	17.1
Original liquor	100	100

The benzole wash in the experiments removed more total phenols than was calculated, leaving less for the butyl acetate to remove. The large experimental loss on evaporation is considered due to entrainment loss of a small quantity of highly concentrated residue.

It will be noted that, from crude liquor entering the plant prenols, concentrated ammonia liquor, and ammonium chloride are produced as saleable commodities. The thiosulphates and thiocyanates accumulate as a concentrate in the mother liquor from the final crystallising evaporator. No methods are suggested for dealing with this, though it could be disposed of by destructive evaporation if there is no sale for it.

(ii) *Alternative Treatment.* Depending on local conditions it may be possible to simplify the Tingley scheme by replacing the benzole dephenolation by butyl acetate dephenolation. The washed liquor would then be distilled for the recovery of solvent and the production of a concentrated ammonia liquor, and finally evaporated. The fourth Tingley stage—*i.e.*, butyl acetate washing of the concentrated chloride solution—would be omitted. In the laboratory this scheme gave the following results:—

Vertical Retort Liquor from Works L.

	O/A removal (vol. × O/A as % of original volume × O/A)
	%
By butyl acetate washing	74.1
By vacuum distillation	5.0
Mother liquor	20.9
Original liquor	100

Whether this scheme would have advantages over Tingley would depend on whether the saving in steam, water, and capital charges would exceed the larger losses of the expensive solvent.

(iii) *New Laboratory Scale Projects.* Attention has been given to the possibility of removing or destroying constituents other than phenols, notably thiocyanate.

(a) Some interesting work has been begun by the Permutit Company, Ltd., on the use of base exchange resins for the removal of thiosulphates and thiocyanates from effluent liquors (24).

(b) The use of chlorine for the treatment of effluent liquors has been described by other workers ((1) p. 1461). Our own investigations were made on liquors which had been washed with butyl acetate, studying the use of both chlorine gas and sodium hypochlorite (see Fig. 6). Spent liquor from Works S was used, which had an O/A value of 1,080. After washing with butyl acetate the O/A was reduced to 260. Without removal of dissolved butyl acetate, done deliberately to prevent the precipitation of insoluble gums, chlorine gas reduced the O/A to 40. Sodium hypochlorite reduced the O/A to 103. The difference between the two methods of treatment is thought to be due to actual chlorination of residual tar acids by chlorine gas, which does not take place when a hypochlorite is used. In both cases there was complete disappearance of thiocyanate.

(c) An alternative method recently investigated was a scheme in which (1) crude liquor (O/A 1,400) was washed with butyl acetate; (2) the washed liquor (O/A 420) was chlorinated to an O/A of about 30, after which active carbon filtration further reduced the O/A to 3. The final effluent resembled water in appearance.

(d) Further work is in progress aimed at complete destruction of those constituents remaining in liquor after butyl acetate dephenolation and ammonia stripping. This work will be reported in due course.

Conclusion

In conclusion I would say that the days when unrestricted pollution of rivers was considered legitimate are coming slowly to an end. An anti-social and dangerous legacy from the industrial revolution is being put away like so many others to the benefit of the community as a whole. But old habits die hard. and also, unless there is an economic gain in the materials discharged as effluents, little will be done without legal compulsion. By legal compulsion, the situation may be so changed that the discharge of untreated effluent may be more costly than treatment and disposal at the works. In fact, the claim is made for the Tingley scheme that treatment will actually produce a revenue. Most engineers will await large scale trials with eagerness. Legal compulsion implies, too, that

methods of treatment are available. That this is so has been one of the objects of this paper. And work is still going on to simplify and cheapen such processes.

A further point which I might suggest is that considerable mutual benefit might be derived from the setting-up of a joint body representative of the gas industry, the Rivers Boards, and the Institute of Sewage Purification for a simplification of the present chaotic scales of charges and conditions of acceptance.

As far as the immediate future is concerned, it may be that with the likelihood of the restrictions of capital development in the fuel industries we shall revert to the state where production schemes alone will have priority. This might mean the temporary hold up of some effluent treatment schemes (just as the steel shortage is holding up several organic sulphur removal schemes) but should be no excuse for complacency.

The writer acknowledges his indebtedness to the Directors of W. C. Holmes for permission to publish this paper, to Mr. J. P. Postlethwaite, of Coalite and Chemical Products, Ltd., for permission to publish details of the Bolsover plant, and to his colleagues of W. C. Holmes & Co., Ltd., research and development staff, for their co-operation.

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DISCUSSION

Mr. **F. Potter** (Scottish Tar Distillers) said that although the effluent problem in Scotland was serious, it was mitigated to some extent by the relatively fast flowing rivers. Probably one of the most important and dangerous forms of pollution which could occur was discharge of tar or oil. This could act lethally in two ways, first by smearing the gills of fish and, secondly, by filming over the surface of the river and preventing contact between atmospheric oxygen and the water. For the production of phenols free from neutral oils and tars, the crude phenols would have to be dissolved in caustic soda and reprecipitated after separation. This was a point in favour of Murdoch and Cuckney's process.

Mr. **Priestley** agreed that solution of phenols had to take place at some point in the process, but that it was better to handle a crude phenol left by distillation rather than a large volume of solvent containing a small concentration of phenol. Recovery of phenol from a solvent by washing it with caustic soda was uneconomic, unless there was a tar acid recovery plant together with its auxiliaries already in existence at the works.

Mr. **J. Sorley** (Motherwell) said that in Scotland it was becoming general practice to base effluent treatment charges at so much per ton coal carbonised. This had its weaknesses because of the variable liquor make. Did the author think 60 gal. per ton coal a reasonable figure? Was it possible to measure the amount of liquor leaving the works? No mention had been made of costs of dephenolation. Mr. Sorley felt sure that gasworks took more than their share of blame for pollution.

Mr. **Priestley** said 60 gal. of liquor per ton of coal was a reasonable figure. Measurement of liquor flow by use of an orifice meter fitted with a recording mechanism which could be locked presented no difficulty. Costs of dephenolation were given by Holton and butyl acetate dephenolation costs would be available in about six months time. Regarding the small works, work was in progress by Holmes which would, if successful, assist considerably to alleviate their problem.

Mr. **J. Greig** (Dawsholm) said he had noticed that the Glasgow river water used by them was strongly alkaline. Secondly, he understood that ammonium chloride solutions, when concentrated and hot, were extremely corrosive. Was this the case with multiple effect evaporators? Thirdly, surely coke quenching with liquors merely transferred the effluent problem from the river to the atmosphere? His final point was in regard to the laying out a new works. Was the separation of the tar and liquor really worth while?

Mr. **Priestley** suggested that the alkalinity of the local river water might be due to the activities of paper works, which required more caustic soda nowadays because of the substitution of straw for esparto grass. Ammonium chloride was extremely corrosive, but corrosion problems were successfully overcome at Corby. He agreed with Mr. Greig regarding coke quenching. As far as the separation of tar and liquor was concerned, this could be justified in actual practice.

Mr. **A. Malcolm** (Paisley) asked what happened to ammonium chloride when liquor was fed on to the bars of producers. Secondly, had the author any experience of the separation of tar and liquor, particularly water gas tar?

Mr. **Priestley,** in reply, said it was difficult to say what degree of dissociation or destruction of the ammonium chloride would take place, but that free chlorine or HCl would be present. This might attack brickwork but might be absorbed by the basic constituents of the ash. He regretted that he had no first-hand information on the handling of water gas tar.

Mr. **R. F. Bell** (Tradeston) asked whether an engineer who installed a concentrated ammonia liquor plant would not in fact be penalised for doing so. Although the effluent would be free from ammonia, the volume going out would be greater, and therefore chargeable. Secondly, Mr. Bell asked for details of liquid/liquid counter current washers, and finally the optimum temperature of washing, using benzole and, alternatively, butyl acetate.

Mr. **Priestley** said that the 1937 Act was vague on the first point raised by Mr. Bell. Much depended in actual practice on the attitude of the local sewage authority. An enlightened authority would require no convincing that a larger volume of effluent liquor was more acceptable than a corresponding smaller quantity of crude liquor. Regarding the second point, the author sketched details of washer constructions and gave the optimum washing temperatures as, benzole, 60° C., butyl acetate, 20° C.

Begun in the First Half of 1948, and not expected to come 'on stream' until January, 1950, at the earliest, the new Shell refinery at Stanlow, near Ellesmere Port, Cheshire, is already in operation, the first main plant, a distillation unit and associated facilities, having started up. It is turning out petrol and other petroleum products from Middle East crude oil at the design rate of approximately a million tons a year.

The Ministry of Labour and National Service is publishing a series of reports on the present and future demand for persons with professional qualifications in science and engineering. These reports have been prepared by 12 sub-committees or panels appointed by the Technical Personnel Committee, presided over by Lord Hankey. The first five of the reports is now available from the Stationery Office, and deals respectively with architecture, chemistry, electrical engineering, geology and physics. The other reports will deal with civil engineering, mechanical engineering, building and quantity surveying, valuation and estate management and surveying, biology, chemical engineering and metallurgy.

There has Hitherto been some lack of uniformity in the symbols employed in the preparation of schematic and other diagrams of engineering plant generally, and the British Standards Institution has undertaken the preparation of a series of standards for graphical symbols by means of which particular items of plant can be conveniently identified. Part 1 of this series deals generally with pipes, valves, and fittings used in connection therein and will be followed by others relating to more specialised fields. Copies of this standard (B.S. 1553, Pt. 1, 1949) can be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, price 2s. 3d. post free.